



INDIA | FEB'23

# Enabling *net-zero* built environment



# Background

Colliers, in association with **RICS** and **Australia-India council** organized a 3-part series of events to discuss the issues of embodied **carbon in built environment and solutions** that can enable change. The series aimed at fostering enhanced alliances between Australia and India and facilitating strategic partnerships and collaborations to **reduce carbon emissions in built environment**.

The event was hosted simultaneously in Australia and India and was live-streamed worldwide and saw an interactive panel of industry experts. The discussions revolved around solutions and approaches towards **sustainability and net-zero construction strategy**. The first session focused on zero carbon construction strategy, while the second discussion was centered around Industry Partnerships for zero-carbon construction networks. The third session focused on educational partnerships, R&D and capacity building.

This report gives an overview of the efforts made by policymakers, governments, and real estate professionals to achieve the net-zero carbon commitments and outlines strategies for a faster net-zero transition of the construction sector.



# A shift towards decarbonizing energy intensive buildings

The construction sector is the backbone of any economy and is pivotal to its growth, accounting for about 6% of the global GDP. At the same time, it is globally responsible for 39% of energy-related carbon emissions, led by emissions from building operations, apart from building materials and construction. As the world population approaches 10 billion, the global building stock is expected to double in size, and likely to contribute significantly to global carbon emissions.<sup>1</sup> Hence, a transition to net-zero buildings has become crucial to achieve global climate goals. World Green Building Council's net-zero carbon buildings commitment is initiated to decarbonize the built environment by reducing carbon emissions.

The commitment aims to reduce the embodied carbon emissions across all buildings by 40% by 2030, and totally decarbonize the construction sector by 2050.<sup>2</sup> According to world GBC, this decarbonization can be achieved through whole lifecycle approach to carbon reduction that takes into account all emissions generated by a building over its lifecycle, including construction, operations as well as demolition and disposal.

## Carbon emissions from buildings

### Embodied Carbon

Emissions arising from production, procurement and installation of building components & materials as well as construction processes. These also include end of life emissions including demolition and disposal.

Sizeable carbon emissions arising from the built environment are attributed to both embodied and operational carbon. The real estate sector largely has been targeting to reduce operational emissions through building regulations, sustainability rating schemes such as LEED<sup>3</sup> and BREEAM<sup>4</sup> and using sustainable facets in building design etc. However, businesses need to effectively address carbon emissions throughout the life of the building from procurement to construction and maintenance.

### Operational Carbon

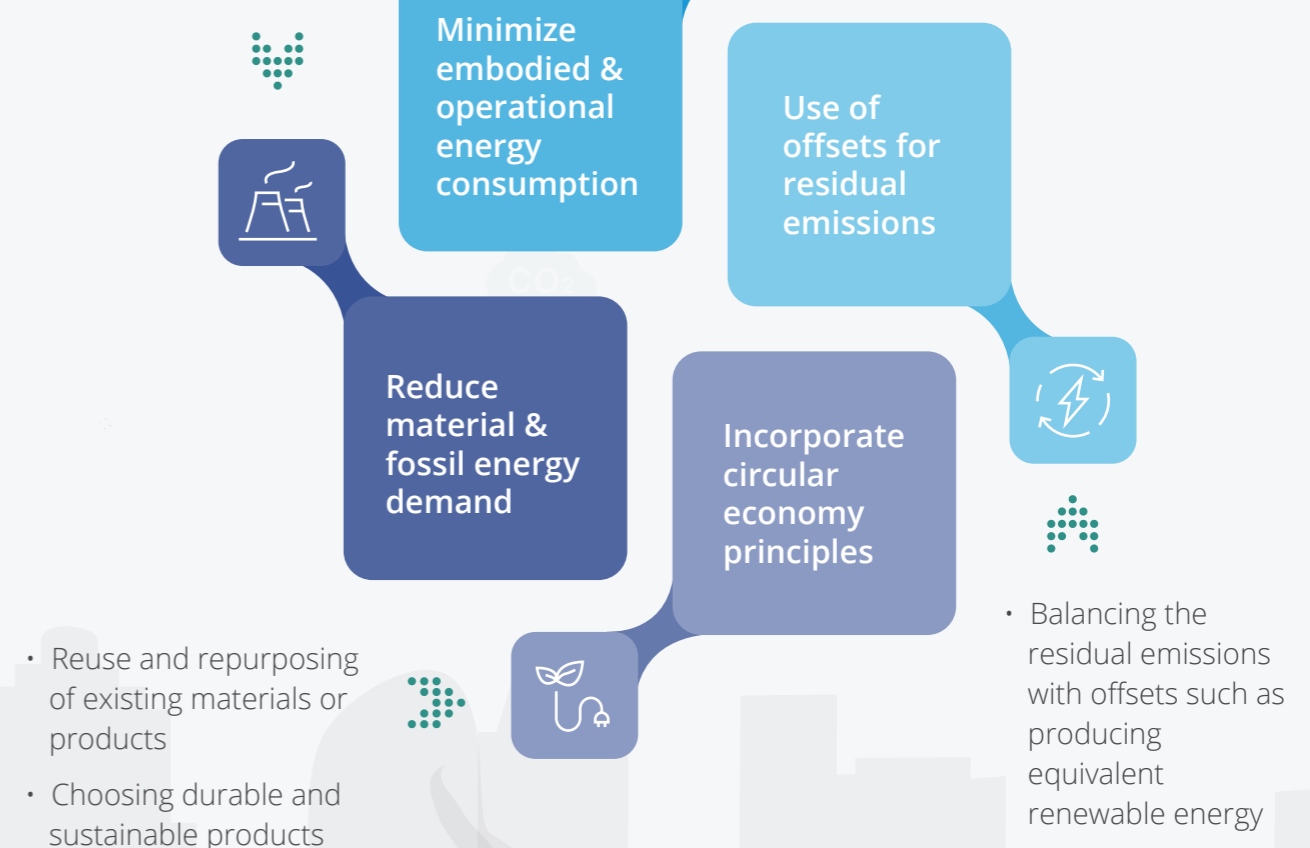
Emissions arising from day to day running of buildings including building operations and maintenance. These mainly include emissions arising from building services such as Heating, Ventilation and Air-conditioning (HVAC) and lighting.

Source: Colliers  
 1- Embodied Carbon - World Green Building Council (worldgbc.org)  
 2- The Commitment - World Green Building Council (worldgbc.org)  
 3 LEED- Leadership in Energy and Environmental Design  
 4 BREEAM- Building Research Establishment Environmental Assessment Method

## What are net-zero buildings?

A highly energy-efficient building wherein its total carbon emissions are balanced by generating equivalent renewable energy on-site or off-site, making it net-zero.

- Reducing energy demand by minimizing needs
- Considering alternative strategies to carry out desired activities
- Reducing the consumption through design optimization and adoption of technologies, materials and practices to minimize emissions



# Small steps leading to a big change

## What is being done ?

India's real estate sector contributes to about one-fifth of the country's total annual carbon emissions and is projected to emit seven times more CO<sub>2</sub> by 2050 from 2005 levels.<sup>5</sup> Hence, developers, investors and occupiers have slowly begun to prioritize their climate strategies around decarbonization of their real estate portfolios.

### Occupiers

Owing to the benefits such as lower operational costs, improved indoor environment, low carbon footprint and stronger brand positioning, occupiers are increasingly preferring high performance buildings. As per Colliers' report 'Real estate 3.0: Technology led growth', high performance buildings can fetch 6-7% higher long-term profit and increase the workforce productivity by 3-5%. At the same time, Green building certifications such as LEED are being considered as benchmark by the occupiers in their leasing decisions as they aim to reduce carbon emissions from their real estate operations.

### Developers and investors

With increased demand from occupiers for high performing assets, a shift can be seen towards developing high performing assets to reduce environmental impact. Typically, green buildings are seen to have higher occupancy levels and rental premiums. This has led developers to prioritize sustainability in their real estate portfolios. Opting for Green building certifications such as LEED and BREEAM has also gained momentum as the demand for such properties is on the rise. While most of these efforts are focused only on building designs, a lot more needs to be done in incorporating sustainable practices in supply chain, material procurement and building development practices.

## A collaborative approach

Occupiers and developers are increasingly entering into green leases, as they advance their commitments towards net-zero transition. Green leases are agreements between landlords and occupiers where both parties undertake specific responsibilities to improve environmental performance of the building. Green leases align the interests of building owners and occupiers through clauses that focus on water/energy conservation, waste reduction and recycling and other sustainable practices. This divides the responsibilities and benefits amongst both beneficiaries creating equal opportunities for both stakeholders in developing energy efficient buildings.

## Government's push for decarbonization getting stronger with revised policies

### Revisions in existing policies

Government is currently revisiting its existing environment policies and is making efforts to make them more holistic and comprehensive. On December 12, 2022, important amendments were made to the Energy Conservation Act, 2001 mandating the use of renewable energy, and carbon neutral technologies; and incorporating sustainability aspects across sectors. The Perform Achieve and Trade (PAT) scheme for industries, and the Energy Conservation Building Code (ECBC) for commercial buildings will also receive significant upgrades with these amendments.

### National Solar Mission

The mission had set the target of deploying 100 GW of grid connected solar power by 2022 through rooftop and large and medium scale grid connected solar power projects. The mission is aimed at reducing the cost of solar power generation in the country through, long term policy, large scale deployment goals, aggressive R&D and domestic production of critical raw materials, components & products. Prime minister launched second largest floating solar project during July 2022, in Kayamkulam after the 100-MW plant at Ramagundam in Telangana.

### Clean Transportation

Government is also encouraging clean transportation to reduce the transport related emissions and dependency on fossil fuel.

5- India's Buildings Sector Moonshot: Corporate Climate Commitments Can Forge the Path - RMI

### India's green Hydrogen policy

Policy facilitates transition from fossil fuels to green Hydrogen/Green ammonia across sectors to bolster its energy security through green hydrogen economy. The policy offers incentives for setting up green hydrogen facilities.



# Challenges in enabling net-zero strategy

The journey towards net-zero is fraught with several challenges. Availability of low carbon building materials and products, lack of proper installation and training to execute highly energy efficient designs, lack of standardized building codes, affordability, and lack of systems for reusing and recycling construction waste are some of the challenges to name a few.



## Building design and development

- Availability of low carbon construction materials
- Lack of sustainable alternatives for transportation of construction materials
- Costing and durability of the sustainable construction materials



## Awareness & expertise

- Lack of technical expertise to implement sustainable designs and construction methods
- Lack of awareness and acceptability – Concrete, glass high-rises that are fully airconditioned and not necessarily energy efficient, continue to be popular amongst occupiers
- Lack of sustainable alternatives for existing key construction materials
- Green washing
- Targeted education at various levels



## Building Operations and demolition

- Limited tools for optimizing energy efficiency in buildings
- Sourcing renewable energy
- No system for disposal and recycling of construction waste



## Regulation & compliance

- Lack of standardized building codes and consistent specification requirements
- Lack of incentives from government for green retrofitting
- Lack of stringent laws for enforcing sustainable practices
- Current rating systems are largely focused on building design and not on aspects such as supply chain, construction materials and waste disposal



## Sustainability benchmarking and Reporting

- Lack of data and tools to measure embodied carbon in buildings for undertaking impact assessment
- Voluntary & inadequate sustainability reporting

# Conclusion and Recommendations

A collaborative approach towards net-zero commitment

## What can developers do?



- Adopt design led approach wherein measures for decarbonization start from the planning stage
- Addressing areas for improvement in existing buildings, especially in terms of renovations and replacement of materials.
- Aiming for green certifications in early stages of construction
- Enhancing the look and feel of sustainable buildings to make them attractive for occupiers
- Using local materials and low carbon materials for construction such as recycled asphalt fly ash, blast furnace slag in concrete mix, replacing steel with Fibre reinforced polymer
- Electrification of equipments and vehicles
- Efficient management of carbon during deconstruction of building through recycling and reusing residual waste

## What can occupiers do?



- Enter green leases with developers
- Reduce operational emissions through efficient space management
- Use of technology to optimize the efficiency in building services
- Use of renewable energy for building operations
- Deploy efficient waste management and disposal system
- Using green and energy efficient HVAC systems
- Mandatory sustainability reporting and climate impact disclosures
- Choose EPD (Environmental Product Declaration) verified products for their buildings

## What can government do?



- Increasing investments in R&D
- Create standardized building codes
- Provide incentives for green retrofitting and development of high-performance buildings
- Create opportunities for locally manufacturing low carbon construction materials at scale
- Provide green bonds and green financing
- Roll out detailed building specifications and mandatory codal provisions and incorporate the same
- Drive education and awareness to incorporate sustainable practices

Despite all the pledges and commitments towards sustainable building practices being made, the gap between the actual performance of the sector and decarbonization targets is widening. As per the 2022 Buildings-GS<sup>6</sup>, the sector's total energy consumption and CO<sub>2</sub> emissions during 2021 surpassed pre-pandemic levels. The energy consumed by buildings also saw a largest increase in the last 10 years, as per the report<sup>7</sup>. Decarbonization of the built environment is complex, and requires rigorous attention across every aspect of building design, construction and operation. All the stakeholders need to take a collaborative approach to address this issue through dynamic policy making, use of innovative technology, aggressive R&D and adopting an inclusive approach towards decarbonization.

6- Global Status Report for Building and Construction, UNEP

7- 2022 Global Status Report for Buildings and Construction | UNEP - UN Environment Programme

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#### Acknowledgments:

Support provided by the Australia-India Council (AIC) in fostering a dialogue between India and Australia to develop The Zero-Carbon Building Construction Network.

The project partners including University of Newcastle, RICSBE Amity University, Beca, University of Adelaide and Colliers International.

More information can be found here:  
[www.aibcnzero.com](https://www.aibcnzero.com)