Making sustainable green building choices can have a positive, lasting and wide-scale impact on the environment

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A shift towards greener infrastructure is essential for our planet. With 90% of our time spent indoors, buildings have a large impact on us. They are also amongst the largest consumers of energy, water, materials, and land, and about 40% of global emissions of Greenhouse gases are attributed to buildings. Although renewable energy system prices have drastically reduced over the years, there are still a few roadblocks in the way of its proliferation. There is a need to incentivise renewable energy adoption through smooth grid interface, net metering policies and tariff structures to make quicker progress.

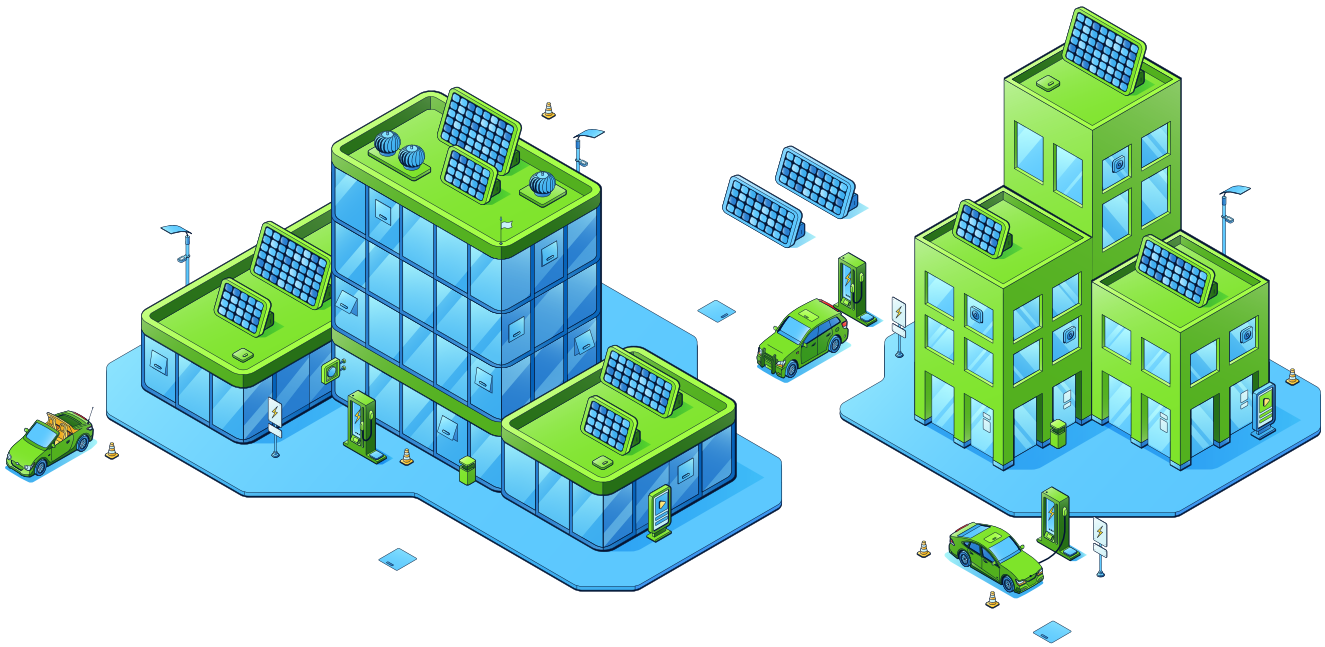
The responsibility to reduce our carbon footprint lies with us because it is for our own comfort, health and well-being. The energy generated from fossil fuels contribute majorly towards climate change and pollution. There is still ample of time to act wisely, save precious resources like energy, water, and materials – and if we do that, our collective action can have considerable impact. Individual interventions such as switching to energy-efficient appliances, turning off taps when we do not need running water, using public transport or walking or cycling, reusing or re-purposing our belongings, and recycling waste to generate useful forms of energy can all have a cascading effect.

GBCI India's joint research study with Saint-Gobain Research India "Healthy Workplaces for Healthier People," deep dives into parameters such as indoor air quality, lighting, access to outdoor views, thermal comfort and acoustics that define workspace quality. The aim of the study was to understand how occupants feel about their workspace and how it impacts them. We studied 30 offices, out of which only one had all the indoor air contaminants within limits prescribed by standards. The study identified carbon dioxide (CO_2) and nitrogen dioxide (NO_2) as the most common non-compliant indoor air contaminants, followed by particulate matter (PM) and formaldehyde (CH_2O). A multitude of studies point to the evidence that indoor air pollution is a cause of increasing morbidities and mortalities, and there is a need for urgent intervention. The first step in the prevention of indoor air pollution is spreading awareness among people about the issue and the serious threat it poses to their health and wellbeing. Education also needs to be imparted on the use of alternative cleaner sources of energy to replace direct combustion of biomass fuel.

Green buildings, especially the ones that are LEED certified, are a clear pathway for cities, communities and neighborhoods to decarbonise. With the help of sustainable design, construction and operations, green buildings are reducing carbon emissions, energy wastage; conserving water; prioritizing safer materials; and lowering our exposure to toxins. Green buildings positively affect public health. Improving indoor air quality can improve productivity by reducing the effects of asthma, respiratory allergies, depression and stress. Realising the importance of green buildings, we at GBCI decided to partner with the leaders in the power industry to develop a holistic, simple and universally applicable tool to support them in developing the most reliable, scalable and resilient grid possible. This tool is PEER, or the Performance Excellence in Electricity Renewal, rating system. It has been created in collaboration with industry leaders and with the

support of key partners such as S&C Electric and the Galvin Foundation. PEER can drive rapid market transformation by bringing together the stakeholders involved in electricity infrastructure and development projects. PEER is being used to strengthen power systems in universities, hospitals, transit systems and even entire cities.

With interventions such as LEED and PEER, we can facilitate the construction of green infrastructure that can help us in reducing global emissions, making our communities more resilient, improving safety and security, creating thousands of new green jobs and catalysing economic growth at all levels.



Role of ECBC on building energy consumption: India's step towards meeting climate targets

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Electricity consumption is a key ingredient to accelerate the economic growth and is one of the important indices that are considered vital for the nation's overall development. India is home to billions of people living in various climatic zones. Providing reliable and quality power supply to them in an efficient manner is an immediate need. Owning to the increase in power consumption, changes in lifestyle and consumption pattern, there is a consistent growth in electricity demand. However, our efforts are focused on reducing our carbon footprints without compromising on growth.

Improving energy efficiency meets the objective of promoting sustainable development, making the economy competitive and reducing the emission intensity of our economy. India has committed to reduce emissions intensity of the national GDP by 33% to 35% by 2030 from 2005 level. In a further demonstration of India's strong thrust on climate action, the Hon'ble Prime Minister of India announced even more ambitious targets for India based on five nectar elements – Panchamrit, at the COP 26 in November 2021. These include:

i. Attaining 500 GW non-fossil energy capacity by 2030

ii. 50 per cent energy mix comprising renewable energy by 2030

iii. Reducing total projected carbon emissions by one billion tonnes from now onwards till 2030

iv. Reducing the carbon intensity of its economy by less than 45 per cent by 2030

v. Achieving Net Zero by 2070

Transformation of the building sector to the most advanced standards of building energy efficiency like near zero energy buildings is crucial for achieving these targets.

In India, the Energy Conservation Act, 2001 provides the basic framework for regulating all initiatives relating to the efficient use of energy and this includes Energy Conservation Building code (ECBC). Building energy codes have been adopted as a regulatory measure for ushering energy efficiency in the building sector.

ECBC was launched by Ministry of Power (MoP), Government of India, in May 2007, as the first step towards promoting energy efficiency in the commercial building sector. The Energy Conservation Building Code (ECBC) sets minimum energy standards for new commercial buildings having a connected load of 100 kW or more, or contract demand of 120 kVA or more. The effective implementation of code provides comfort to occupants by adopting passive design strategies and day light Integration. It is technologically neutral, promotes renewable energy and also emphasizes on life cycle cost of building. The updated code was launched in 2017, which had additional priorities of renewable energy integration, ease of compliance, inclusion of passive building design strategies and, flexibility for the designers.

One of the major updates to the code is inclusion of incremental, voluntary energy efficiency performance levels. There are three levels of energy performance standards in the Energy Conservation Building Code (ECBC) i.e., ECBC, ECBC Plus, Super ECBC. In ascending order of efficiency, ECBC compliant building has approx. 25% savings, ECBC+ building approx. 35% savings and compliance with Super ECBC building will show energy savings by 50% or more, as compared to conventional building.

The major components of the building which are being addressed through the code are: envelope (walls, roofs, windows), lighting systems, HVAC systems, water heating, water pumping and electrical power system.

There are many different types of commercial buildings that fall under the purview of the Code. These buildings are different from each other in basic typology, usage of spaces and occupancy. Hence, the Code has requirements for different kind of buildings broadly based on building classification in the National Building Code of India. Spatial layouts, material specifications, facade characteristics, and occupancy patterns have an impact on energy efficiency of a building and differ for these typologies.

Building energy codes are hinged on climate responsive buildings that use local natural resources and climatic conditions to their advantage. ECBC 2017 supports many of objectives of the Government of India for achieving energy security, economic growth and environmental sustainability. As a primary policy driver for guiding building construction, it is a forward-looking code and will push the building sector towards near zero energy targets. The Government of India's Smart Cities Mission, India Cooling action plan are linked with sustainable urban infrastructure development with focus on efficient use of energy in buildings.

India is in a massive construction phase and incorporation of energy efficiency norms can act as a transformative tool for GHG abatement by the efficient built stock. The building sector in India is experiencing an unprecedented growth. It has 38% (~208mtoe) of the India's total primary annual energy consumption and 31% (296 TWh) of the total annual electricity consumption with residential and commercial sector having 23% and 8% of total electricity consumption respectively. Buildings also represent a dominant share of India's overall cooling demand. "The commercial sector floor area in 2017-18 is estimated to be 1160 million m2 and is expected to grow 1.6x in the next decade to 1880 million m2, and 2.7 times the size of 2017-18 to 3090 million m2 by 2037-38. The percent air-conditioned area is expected to increase from approximately 26% in 2017-18 to 43% in 2027-28 and around 54% by 2037-38". (AEE report: Building Stock Modelling)

Under national missions like Housing for All, Smart Cities & Solar Cities, India is witnessing significant increase in commercial and residential building stock with lock-in period ranging from 30-50 years. The national missions and codes aligned to building energy efficiently and sustainably such as National Mission on Sustainable Habitat (NMSH), National Mission on Enhanced Energy Efficiency (NMEEE) now renamed Roadmap Of Sustainable And Holistic Approach To National Energy Efficiency (ROSHANEE), Energy Conservation Building Code (ECBC – both for commercial and residential) focus on building design and construction practices but require to upscale implementation to fully realise their potential. The upcoming construction presents a unique opportunity to leapfrog into low carbon and resource-efficient future by building it responsibly. Incorporating energy efficient design and construction strategies, buildings can inherently have a reduced energy consumption footprint over its operating lifetime. Existing examples of high-performance buildings in India show that on an average the annual energy consumption of such buildings could reduce by 30-40%. Further deployment of energy efficient appliances can significantly transform the energy consumption trajectory.

"*The risks of climate change are the strongest negative externalities that affect India and other countries. As Hon'ble Prime Minister said at the COP26 summit in Glasgow last November, "What is needed today is mindful and deliberate utilisation, instead of mindless and destructive consumption.*" The low carbon development strategy as enunciated in the 'Panchamrit' is an important reflection of our government's strong commitment towards sustainable development.