PUNE INTERNATIONAL CENTRE

PIC-VK:e Roundtable on Decarbonising Real Estate Sector in the Pune Region

(Conference Report)

January 2024

In collaboration with

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Globally, the entire life cycle of the built environment accounts for roughly 26% of all greenhouse gas (GHG) emissions and 37% of combustion-related emissions[1]. In India, the building and construction sector is responsible for a sixth of all GHG emissions[2].

India has made international climate commitments to reduce the emissions intensity of its economy by 45% by 2030, compared to 2005 levels, and to achieve net-zero emissions by 2070. Hence, **decarbonising the building and construction sector is crucial for achieving India's climate pledges.**

In this context, the roundtable focuses on one of India's largest urban areas and Maharashtra's second largest metropolitan agglomeration, the Pune Metropolitan Region (PMR). Its vibrant industrial and educational ecosystem has made it one of the fastest-growing urban areas, with a projected population of a million-plus by 2030.

Pune International Centre's flagship project, **'Rapid Decarbonisation Potential of Pune Metropolitan Region (PMR) - Net Carbon Neutral PMR',** suggests that the region is poised for a **decadal growth rate of 28% in the infrastructure sector.** The **infrastructure and building** sector **in the region alone contributes to a quarter of the total** carbon emissions. Its long-term outlook suggests that the metropolitan region has the **potential to save 45% of the GHG emissions by 2030 from the correct implementation of several green building norms and practices.**

Given that over 60% of the region's infrastructure is yet to be developed, and several buildings are going in for redevelopment, the region holds massive potential to transform into a well-planned and climate-resilient metropolitan region for the future. Development without paying any heed to carbon balance, the natural environment, and communities has a direct impact on the city's resilience to unforeseen climate events.

The roundtable highlighted the opportunity for green development of both older structures of the city that are rushing in for **'Redevelopment'** and **the development of new infrastructure.** With the larger objective of taking forward the goal of 'Net Carbon Neutrality in PMR', this roundtable aimed to provide a platform for discussing low-carbon development avenues for the real estate sector in PMR.

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[1] https://www.mckinsey.com/industries/engineering-construction-and-building-materials/our-insights/building-value-by-decarbonizing-the-built-environment

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[2] https://unfccc.int/sites/default/files/resource/India-TNC-IAC.pdf

Objectives

The objective of the event was to take forward PIC's flagship initiative, 'Rapid Decarbonisation Potential of PMR' and identify key aspects and potentials of the real estate sector in order to make it Net Neutral in the coming time. The roundtable engaged experts from fields of architecture, energy and environment in order to discuss emission sources at different stages (embodied and operational) and solutions to reduce these emissions.

Participation

Prof. Amitav Mallik: Head, EECC, and Trustee, PIC, as Convenor

Dr. Poorva Keskar: Director, VK:e Environmental International, as Keynote Speaker

Mr. Ranjit Naiknavare: CREDAI Chairman for Pune Metro, as Chair

Dr. Sunita Purshottam: Head of Sustainability at Mahindra Lifespace Developers, as Invited Speaker

Sandeep Sonigra: Managing Director at Orange County Group, as Invited Speaker

Ganesh Jadhav: Co-Founder of Gangotree Homes and Holidays, as Invited Speaker

Other attendees included developers, architects, ESG Consultants and industry bodies. The roundtable was attended by over 70 experts.

Discussion Areas

The discussion covered three key areas relating to decarbonising real estate in PMR. It focused on embodied emissions, operational emissions and sustainable redevelopment opportunities.

Buildings are responsible for carbon emissions through their entire lifecycle, i.e., from construction phase to operational phase as well as when they get demolished. The carbon emissions are mainly because of the energy used during this life cycle. Energy used during construction for extraction of the materials, processing of the material into usable building components, transportation of the materials to the site, installation and maintenance is referred to as the embodied energy of the material. This is one-time energy investment in the building. While the energy used to operate the buildings is called "operational energy" of the buildings.

The total embodied energy of all materials used in the building can be referred to as the embodied energy of the building. Generally, the embodied energy is 20%, while the operational energy is 80% of the total energy that the building is using during the entire lifecycle (for decarbonisation estimation, only the embodied footprint is considered as operational footprint and is taken into account in electricity and transport sectors).

In the long term, the real estate sector in urban areas becomes all the more important as roughly 60% of the world's population is expected to live in cities by 2030. A United Nations Human Settlements Programme (UN-Habitat) report shows that although cities are spread over 2% of the total land area, they contribute to 70% of GHG emissions. It shows that the built environment will be crucial to an effective, resilient and just transition to a net zero future of cities.

In India, the building and construction sector is responsible for a sixth of all GHG emissions. In order to fulfil its climate commitments, India will have to anchor its policies towards achieving emissions intensity reduction of its GDP by 45% by 2030 and achieving net zero by 2070. Additionally, with many areas and buildings across Pune going for redevelopment opportunities, by identifying the pros and cons, there is potential for sustainable redevelopment.

Discussion Highlights

The discussion majorly focused on identifying sources and potential to reduce emissions, possible areas of innovations, their economic benefits for all the stakeholders, and existing challenges in implementing and scaling it.

Prof. Amitav Mallik, Trustee, PIC, and Head of EECC

- PIC's flagship initiative of 'Rapid Decarbonisation of PMR - Feasibility Report 2022' analysis shows that after Electricity and Transport, Construction (Operational and Embedded emission) sector is the third biggest emitter of carbon. Additionally, the development of the real estate sector has long carbon-lock in periods. The built environment has a minimum lifespan of 30 to 40 years. Therefore, studying emissions and initiating reforms to curb emissions are important for the earth's environment.

- The roundtable intended to bring to the fore that Net Neutral is just half the decarbonisation story. The other half is to restore things that we have damaged so far.

Dr. Poorva Keskar, Director, VK:e Environmental

- India faces scarcity of water, land and other resources. This scarcity is prone to get severe in the coming times. The construction sector contributes to one third of the total emissions in direct and indirect ways.

- The IPCC (Intergovernmental Panel on Climate Change) report stated that in terms of investment for green transition, the real estate sector will require one of the lowest capital inputs for transition to become net zero.

- Within the construction sector, studies have shown that 80% of emissions in this sector are related to energy. Once you target energy, a major chunk of the transition progress can be achieved.

- Some of the provisions that the government has undertaken in order to rate sustainability in buildings are Eco Niwas Samhita, Building Passport by BEE, ECBC, etc. Similarly, private sector ratings are LEEDS, Edge, GRIHA, etc.

- Design is a crucial aspect of developing low-carbon buildings; thus, aesthetics won't be compromised for decarbonising purposes.

- In existing buildings, reduction in emissions can be undertaken with change in use of appliances and other operational measures; estimates suggest that these measures can reduce approximately 45% carbon emission.

- To achieve complete Net Carbon Neutrality, the need is to go beyond energy sources and uses, using RE for construction and for operational use, tree plantation, green grid electricity, among other measures.

Dr. Sunita Purshottam, Head of Sustainability, Mahindra Lifespace Developers

- Operational carbon emissions make up a substantial portion of building emissions. Owing to notable strides in energy efficiency, cutting down on operational emissions is an easily attainable goal, also referred to as a "low hanging fruit" in real estate decarbonising measures.

- Impacts of climate change are visible in cities in form of urban heat island effects. Cooling requirements of cities such as Pune are expected to rise. This is a deviation from the earlier days and the real estate sector needs to respond to these changing

requirements. The role of ventilation becomes crucial for thermal comfort. Unless well-planned by developers, people will face not only temperature comfort issues but also health and discomfort challenges as well.

- Climate Responsive Development (CRD) is essential and must be the centre of all development projects, a shift from the current thinking of utilising as much FSI as possible. CRD will include practices like 30% tree cover of total area and ample ventilation.

- Not just gross emission count, but real estate must conduct micro-accounting of GHG emissions at all stages of development.

- Additionally, the speaker highlighted the water-energy nexus. Thus, decarbonisation limited to net-zero electricity is not sufficiency; there is a need to focus on net-zero water and net-zero land as well.

- Furthermore, there is a need to focus on Science Based Climate Target in order to achieve India's Nationally Determined Contributions. For the real estate sector, accelerating the net zero emission across the built environment by 2030 for new buildings and 2050 for old buildings along with a 40% reduction in embodied carbon by 2030 and net zero by 2050 is crucial.

- The speaker shared the following strategies to reduce carbon footprint of buildings:
  - Select sites on suitable soil condition; for example, conduct hydro-geology studies
  - Identify low carbon material for the structure of building
  - Design for longer lifespan of the site
  - Optimising the building shape
  - Interacting with vendors and demanding them for low carbon emission material.

Mr. Sandip Sonigra, Founder Director, Orange County Group

- Using the age old and proven Indian knowledge system in today's development is essential and helpful. E.g., Mohenjodaro-Harappa, the oldest townships of India, which used lime, jaggery and other natural components in construction.

- In 2012, as the first pilot project at Orange County, Lime was used wherever possible, and100% renewable energy was used. After that CO2 footprint was calculated, which showed huge changes.

- Lime is only construction material with formula COOH and with CO2; it reacts and forms CHO3, i.e., calcium carbonate. So, carbon sequestration was possible due to lime. The results were:
  - Reduces the temperatures of buildings by 3-5 degrees.
  - Electricity bills reduced to almost Rs 150-200 per month due to ventilation, natural cooling and use of renewable energy.

- Case Study: Evo Green Township – India's first sustainable township
  - Emphasis on building carbon neutral township
  - Lime along with jaggery (kakvee) as mortar and plaster wherever possible
  - 120+ local biodiversity species with 2 lakh trees planted as biodiversity park before even a single construction
  - Radiant cooling technology instead of air-conditioned systems: 18 degrees Celsius average temperature
  - Use of IOT, AI with energy consumption indicators, which show consumers their consumption behaviour, bringing behavioural changes
  - Economics: Additional Rs 300 per sq. feet as green contribution in the Quotation. No customer ever asked or argued about it.

- The speaker suggested that developing consensus among the developer fraternity for using alternative materials to the optimum is essential, and promoting strong research in areas of alternative materials is needed.

Ganesh Jadhav, Co-Founder of Gangotree Homes and Holidays

- Potential intervention for Sustainable Redevelopment:
  - Sustainable design and planning
  - Water efficiency and recycling, reusing of water
  - Using energy efficient appliances
  - Solid waste management and energy generation
  - Organic or eco-friendly, health-friendly paints
  - Developing tenant do's and don'ts guidelines for reducing wastage and emissions.

- The speaker highlighted that Maharashtra has conducive policies for promoting green redevelopment; for example, FSI norms are designed to incentivise sustainable redevelopment. Awareness about these policies and incentives provided by the government are crucial for promoting sustainable redevelopment.

Mr. Ranjit Naiknavare, CREDAI Chairman for Pune Metro

- Although the real estate sector is moving towards low-carbon development, there is still a lot of potential towards sustainability goals. Increased formalising of the sector is a starting point for this transition towards a net zero real estate sector. However, a change of this scale and kind requires coordinated efforts and time.

- A recent McKinsey report suggests that the real estate sector contributes around 1/4th to 1/3rd of total emissions in India.

- The pace of Pune's real estate sector growth is one of the highest across the country. Thus, addressing this issue of carbon emissions at the legislative and implementation stage is crucial.

- To achieve the desired targets, working on all fronts and at all stages of the construction sector (manufacturing of required materials, actual construction design, post construction operational activities) is highly necessary.

- India aims to become net carbon neutral by 2070. In accordance with it, CREDAI (Confederation of Real Estate Developers Associations of India) plans to hasten this process and make the real estate sector carbon neutral by 2050.

- One of the crucial factors limiting the green transition of Pune's real estate sector is lack of knowledge among the developer group. CREDAI is willing to work with all to make their developers aware about potential benefits and the necessity.

- The president of CREDAI Pune Chapter showed enthusiasm to collaborate with PIC and VK:e Environmental in developing a paper for Net Zero Real Estate sector for Pune region. At the same time, he suggested that housing societies must also follow their duties. As per norms, the real estate developers are mandated to provide for Sewage Treatment Plant (STP), Organic Waste Composter (OWC) and several other such facilities. But, it is the residents of the housing complexes who need to maintain these facilities and look after its upkeep. Thus, cooperation and support from building residents and home buyers is crucial.

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