Building Better: Resource Efficiency and Lean Construction for India’s Low Carbon Buildings

Context & Rationale

The building sector accounts for 25% of India’s national GHG emissions with operational energy use contributing 52% and lifecycle embodied carbon in building materials contributing 48%. Key construction materials, cement, steel, bricks, aluminium, and glass, represent 48% of total building lifecycle emissions. Meanwhile, 73% of India's projected 2050 building stock and 86% of the 2070 stock is yet to be built. India's construction growth will create significant demand for materials, infrastructure and floor space, with long-term implications for energy demand, carbon emissions and India’s clean energy transition.

The challenge is therefore not simply to substitute conventional materials with greener alternatives, but also to reduce the quantity of resources required to deliver the same functional outcome. While improving building energy efficiency and transitioning to clean energy are essential to reducing operational emissions, addressing material use and construction processes is equally important for reducing embodied carbon and the emissions associated with energy-intensive material production, transportation and construction.

Adopting resource efficiency and lean construction during early design stages prevents long-term carbon lock-in and reduces embodied carbon across the lifecycle. Integrating these approaches into building design and project delivery can complement operational energy efficiency and clean energy measures, supporting a whole-life approach to building decarbonisation and India’s broader energy transition.

Objectives

- Explore and raise awareness on the role of lean construction in optimising construction process without compromising performance in construction, thereby reducing embodied carbon and associated energy demand across the construction value chain.
- Explore innovative construction technologies.
- Explore whether material savings, productivity gains and reduced waste can provide a stronger business case to encourage adoption of the principles for environmental benefits.

Discussion Modules

- Explore how lean construction principles and efficient construction practices can minimise material wastage, rework and resource consumption across construction processes. Highlight how various measures can improve construction productivity, reduce material demand and transportation needs, and lower embodied carbon and emissions associated with energy-intensive materials.
- Presenting case studies on Lean Construction, innovative construction technologies (3D construction) to examine their potential to reduce material use and construction waste thereby improving resource efficiency. Discuss how these approaches can contribute to lower embodied carbon and complement efforts to reduce energy consumption. Where evidence is available, explore demonstrated reductions in material quantities, energy use, costs and carbon emissions, alongside the conditions required to replicate and scale these approaches in India.

Intended outcome

A practical understanding of the role of resource efficiency and lean construction in addressing embodied carbon lock in and the emissions associated with energy-intensive material production, transportation and construction.

Target Audience

Architects, engineers, urban planners, real estate developers, sustainability consultants, project managers, government officials, policy makers, think tanks, civil society organisations, architecture and engineering students.

Date: 05th November 2026

Time: 90 minutes, 11:00 am- 12:30 pm

Speakers:

1. Prof. Ashwin Mahalingam, Department of Civil Engineering, IIT-Madras
2. Dr. Kalyan Vaidyanathan, CTO- Construction, Tvasta Construction
3. Sumedha Malaviya, Program Head, Building Decarbonisation, WRI India

Agenda

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Time: 11:00 AM - 12:30 PM IST
Duration: 90 minutes

Time	Duration	Session	Speaker
11:00-11:05 AM	5 min	Welcome and Context Setting	Shyny Sam, WRI India
11:05-11:30 AM	25 min	Insights from Industry and Case Studies: Lessons from implementing lean construction and resource-efficient practices, including implementation challenges and potential for scale	Dr. Kalyan Vaidyanathan, Tvasta Construction
11:30-11:55 AM	25 min	Process Efficiency in Construction Process: The Role of Lean Construction, Process Optimisation and Efficient Construction Practices in Reducing Resource Consumption, and Carbon Emissions	Prof. Ashwin Mahalingam, Dept. of Civil Engineering, IIT Madras
11:55-12:25 PM	30 min	Moderated Discussion: From Resource Efficiency to Carbon Reduction - What Will It Take to Scale? Discussion with speakers and participants on practical implementation, business incentives, barriers and opportunities for mainstreaming resource efficiency in India's construction sector	Moderated by Sumedha Malaviya, WRI India
12:25-12:30 PM	5 min	Key Takeaways and Closing Remarks: Priority actions and opportunities for wider adoption	WRI India