

# Decarbonising the Built Environment at Scale

Design first. Materials next. Data to scale both.

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EPD International  
New Delhi, 08 Oct 2026

# Indian cities will add over 500 million people by 2050.

Sustainable urbanisation is nation-building, and it needs solutions that can scale.

## How Lodha Foundation approaches it

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### The living lab

Lodha's developments are our test bed: large enough for real data, complex enough for real barriers.

### Pilot. Verify. Scale.

The pilot is not the output. The template others can adopt is.

### Everything is open access

Data, findings and templates are published openly. Collective progress is the measure.

# Three levers, in order: design first, materials next, data to scale both

NOW · at the drawing board

## 1 Design

**20–40%**

below the IGBC benchmark across our ten buildings, with conventional materials



NEXT · as supply chains allow

## 2 Materials

**15–30%**

building embodied carbon from low-carbon cement, steel, aluminium and others



ENABLER · makes materials buyable

## 3 Data

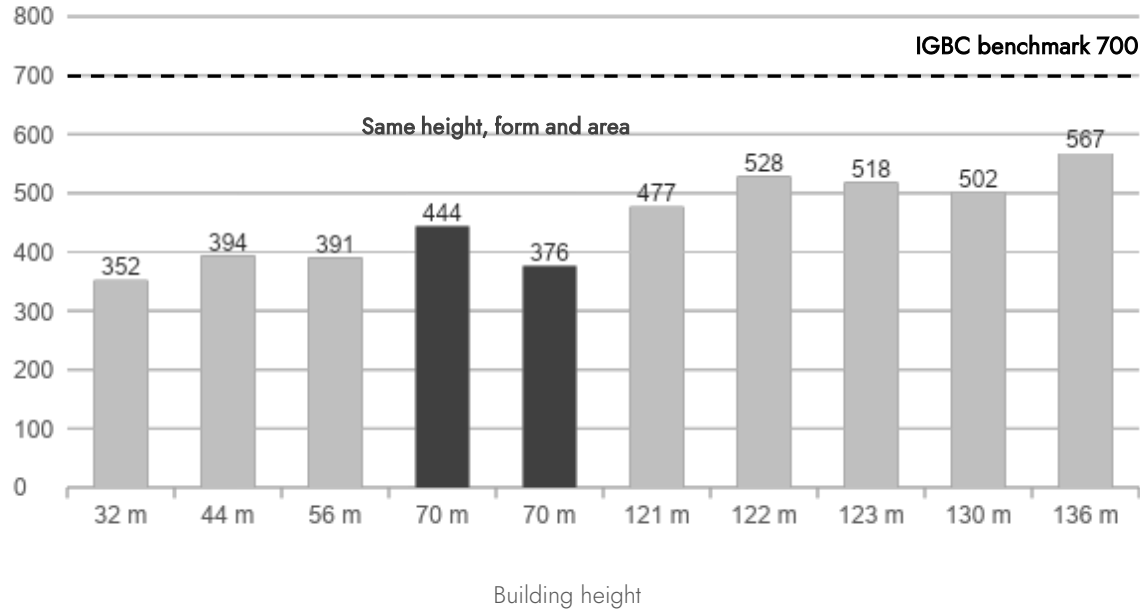
**EPDs**

let a buyer specify, compare and pay for lower-carbon materials

**Design is the biggest lever and the fastest to pull. Materials come next. Data is what lets materials scale.**

Sources: Lodha Group baselining and composite-cement pilot; IGBC Net Zero Carbon rating (700 kgCO<sub>2</sub>e/m<sup>2</sup>)

# Design is the biggest lever: all 10 buildings sit below the IGBC benchmark



**+61%**

from 32 m to 136 m: height and form are design decisions

**15%**

between two towers of identical height, form and area



Source: Lodha Group embodied carbon baselining study (kgCO<sub>2</sub>e/m²); IGBC Net Zero Carbon rating, civil materials per bill of quantities

# Design acts fastest, needs no supply chain, yet it is still not standard practice

## What design efficiency means

- 1 Direct load paths to foundations
- 2 Controlling flexure in structural systems
- 3 Regular geometries and symmetry
- 4 Designing for durability

## Why it is not catching up

- 1 Structural design follows convention, not efficiency
- 2 Carbon-intensive codes and industry conservatism
- 3 No benchmarks or embodied carbon KPIs in design briefs
- 4 Few portfolio-level buyers asking for it

**The first fix:** put an embodied carbon KPI in every design brief.

# Materials come next: three materials hold 70–90% of a building's carbon

## Concrete

40–50% of building carbon

30–50%

lower-carbon cement vs OPC (GGBS, composite, LC3)

**Lever** Match the binder to the geography. Our pilot: –14% for the whole building, against our usual mix

**Held back by** Supply geography; specification inertia

## Rebar

15–20% of building carbon

2.2 → <1.0

tCO<sub>2</sub>/t, technically viable by 2030 (projection)

**Lever** Scrap-based electric furnace route and renewable power

**Held back by** Fragmented producers; weak traceability

## Aluminium 15–20% of building carbon

~95%

lower for recycled vs primary, global average (IAI)

**Lever** Recycled content in facades, windows and formwork

**Held back by** No taxonomy; premium with no aggregated buyer

# Composite cement and LC3 are being piloted on live projects

## Composite

G+23 residential tower, Mumbai



## LC<sup>3</sup>



○ Concrete Road segment with LC<sup>3</sup>

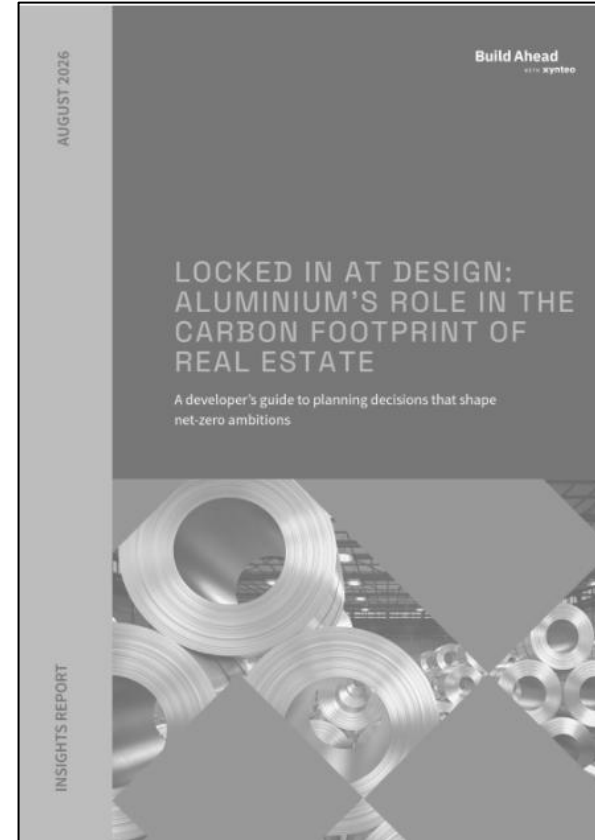
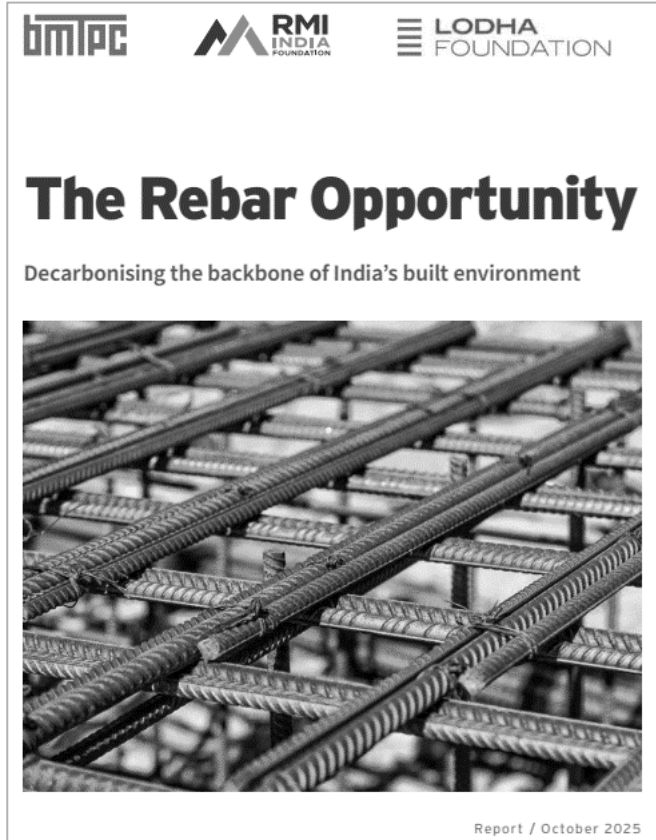
○ LC<sup>3</sup> concrete pour on site via TM

○ LC<sup>3</sup> concrete pour on site via bucket

○ Workability: Slump Loss

○ Flow at RMC

## Further reading: open-access reports on rebar and aluminium



# Low carbon materials scale only when we can specify them, and that takes EPDs

**Today the industry buys on price, grade and delivery.**

Carbon is mostly out of picture

**10–30 weeks, ~₹10–15 lakh**

to publish a first EPD (RMI)

**Enabled by markets accounting carbon**

EU CBAM began pricing cement, steel and aluminium imports

**Lets start with what matter most: Concrete, Steel...**

Lodha measures carbon data for all types of construction

**What a buyer needs from an EPD:** plant-specific, comparable across producers, affordable for small producers and fast.

# The ask, in the same order

## 1 Design

### Developers and designers

Put an embodied carbon KPI in every design brief.

## 2 Materials

### Manufacturers

Publish plant-specific EPDs for cement, concrete, rebar and aluminium.

## 3 Data

### Programme operators, verifiers and buyers

Make EPDs comparable, faster and affordable. Buyers: specify them and pool demand.

**Design first. Materials next. Data to scale both.**

**Thank you!**

**Aun Abdullah**

Programme Director, Sustainable Urbanisation, Lodha Foundation · [aun.abdullah@lodhagroup.com](mailto:aun.abdullah@lodhagroup.com)

# Appendix: embodied carbon across ten buildings ranges from 352 to 567 kgCO<sub>2</sub>e/m<sup>2</sup> and tends to rise with height



## Insight Brief

Baselining Embodied Carbon in Building Sector: a comparative study across building heights

| Building | Configuration | Height (m) | Built-up area (sqm) | Embodied carbon (kgCO <sub>2</sub> e/sqm) |
|----------|---------------|------------|---------------------|-------------------------------------------|
| B01      | G+10          | 32         | 8,026               | 352                                       |
| B02      | G+14          | 44         | 16,989              | 394                                       |
| B03      | G+18          | 56         | 15,984              | 391                                       |
| B04      | G+23          | 70         | 10,424              | 444                                       |
| B05      | G+23          | 70         | 10,490              | 376                                       |
| B06      | G+35          | 121        | 32,150              | 477                                       |
| B07      | G+39          | 122        | 34,617              | 528                                       |
| B08      | G+40          | 123        | 43,965              | 518                                       |
| B09      | G+40          | 130        | 29,091              | 502                                       |
| B10      | 2B+G+40       | 136        | 127,830             | 567                                       |

Source: Lodha Group embodied carbon baselining study

# Appendix: Rebar could drop below 1.0 tCO<sub>2</sub>/t by 2030; fragmentation, not technology, is the bottleneck

## Built environment consumes ~60% of India's steel

Rebar intensity: ~2.2 tCO<sub>2</sub>/t (India) vs 1.4 world avg  
Green Steel Taxonomy 5-star: 1.6 tCO<sub>2</sub>/t  
Path to <1.0 by 2030, ~0.5 by 2035 is technically viable.

### Lever 1 — Scrap Quality & Recovery

- Scrap share: 21% (target 50% by 2047 under the National Steel Policy)
- Scrap → EF route delivers ~60% lower emissions vs BF-BOF primary production
- Rebar suits the EF route: embedded in concrete under 20–50 mm of cover, so quality specification is manageable
- Constraint: informal scrap ecosystem → price volatility, quality inconsistency, traceability gaps

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### Lever 2 — Renewable Electricity

- RE penetration in Indian steel sector: only ~7.2% of total electricity consumption
- PPAs, open access and captive RE can reduce power cost 15–20% vs grid
- As grid decarbonises, EF-route rebar intensity falls automatically — no process change needed
- Constraint: coal-based captive power remains economically dominant; limited RE-ready EF capacity

## The structural problem: small supplier fragmentation

Fragmented production base

No coordinated demand signal

Traceability & MRV gap

# Recycled aluminium emits ~95% less than primary, but no buyer or taxonomy yet pulls it into buildings

Recycled aluminium emits ~95% less CO<sub>2</sub>e than primary: 0.5 vs 15.1 tCO<sub>2</sub>e/t globally (IAI, 2022)

## The opportunity

- India primary: ~16–20 tCO<sub>2</sub>e/t, coal-powered smelting. Global recycled: ~0.5 tCO<sub>2</sub>e/t
- Formwork aluminium (Mivan, table forms) is a closed-loop opportunity
- Facades, windows and door frames: secondary aluminium is viable

## India context

- India is the second-largest producer, and primary smelting is coal-powered
- Scrap collection infrastructure is informal and geographically fragmented
- Limited green aluminium; no demand signal yet
- Xynteo (2024) identifies buildings as a priority end-use for green aluminium transition in emerging markets — India as high-leverage case

## Levers & blockers

- Lever: EPD-led specification builds a demand signal with enough market share to move suppliers
- Blocker: No green aluminium taxonomy in India
- Blocker: Certified secondary supply carries a premium with no aggregated buyer to absorb it

Reference: Xynteo, *Decarbonising Aluminium in Emerging Markets (2024)*; International Aluminium Institute (2022). IAI compares cradle-to-gate primary with gate-to-gate recycling, so scrap burden is excluded. Sector decarbonisation report to be published soon.

# EPDs are practical now, and RMI expects them to be a requirement for Indian building products by 2030

**RMI (Dec 2025):** by 2030, EPDs are likely to become a widespread requirement for building product manufacturers in India

**10–30 weeks**

to get a first EPD

**₹10–15 lakh**

typical cost of a first EPD

**90,000+**

EPDs now listed on EC3

**Jan 2026**

EU CBAM prices cement, steel and aluminium imports

## Why manufacturers act

- Earns product credits under LEED, IGBC and GRIHA
- Increasingly requested in public procurement and international tenders; EU CBAM now prices embedded emissions in cement, steel and aluminium imports
- Doubles as an efficiency audit: energy, waste and logistics fixes pay back quickly

## What Lodha requires

- EPDs for all steel and concrete used in our projects
- “You can’t manage what you haven’t measured” — EPDs are the basis for product selection and for benchmarking our embodied carbon goals
- Portfolio-level demand, not one-off projects, is what moves suppliers

## The missing piece is demand

- Few portfolio-level buyers and no coordinated demand signal
- No embodied carbon KPIs or benchmarks in design briefs, so nobody asks for the number
- Certified lower-carbon supply carries a premium, with no aggregated buyer to absorb it

Source: RMI (Dec 2025); EC3; Regulation (EU) 2023/956 (CBAM); Lodha Group