Build Ahead
WITH xynteo

HARNESSING GREEN PUBLIC PROCUREMENT FOR A SUSTAINABLE FUTURE

Build Ahead recommendations for procurement of low carbon building materials in line with the Green Procurement Pledge

EXECUTIVE SUMMARY

Urgent action is needed to decarbonise crucial but emissions-intensive materials like cement and steel. To support India in beginning its green public procurement journey and spur demand for low carbon materials, Build Ahead has put together a framework with recommended policies for adoption. The framework is based on the Industrial Deep Decarbonisation Initiative's Green Procurement Pledge and is designed to be flexible, feasible, and beneficial. The framework provides the industry lead time to adjust to more stringent requirements, while accruing immediate emissions reduction benefits.

WHY DO WE NEED TO TALK ABOUT LOW CARBON CEMENT AND STEEL?

Cement and steel are two of the most emissions intensive commodities in the world, contributing to approximately 16% of global greenhouse gas emissions. Yet they are critical components in the construction of an equitable future for all. Creating safe cities – roads, highways, housing, hospitals, and everything in between – requires cement and steel.

In buildings, cement and steel contribute to embodied emissions. These are different from the operational emissions, i.e., the emissions produced during the use-phase of a building. Instead, embodied emissions are generated in the construction, maintenance, and disposal of a building. Currently, they represent about 30-40% of a building's lifecycle emissions. But this proportion is expected to grow to 50% or more by 2050 as the proportion of operational emissions reduces due to progress in energy efficiency and greening of grids through renewable energy.

An estimated 80% of the world's cement and 90% of its steel is produced in ten countries. Among them, India is the second largest cement and steel producer, with capacity to produce the equivalent of 7% of global production for both. With such a large impact on global production and emissions, and a burgeoning population to cater to, India is at a critical juncture. Over 50% of its 2030 residential and commercial building stock is yet to be constructed, and business-as-usual puts India on track to become the world's largest producer of embodied emissions by 2050. Urgent action is required.

> *"Over 50% of its 2030 residential and commercial building stock is yet to be constructed, and business-as-usual puts India on track to become the world's largest producer of embodied emissions by 2050. Urgent action is required."*

WHAT IS THE ROLE OF GOVERNMENT?

35% of cement demand in India is generated by the government[1] . Due to anticipated infrastructure development, public demand for cement is expected to more than double by 2030[2]. As both regulator and customer of cement and steel, governments are in a unique position to jumpstart markets for green building materials. They can set a standard and be among the first large-scale consumers of green products.

This is the basic idea that led to the creation of the Green Procurement Pledge (GPP), outlined in Figure 1. The GPP is an initiative under the Industrial Deep Decarbonisation Initiative (IDDI), a global coalition of public and private organisations working to stimulate demand for low carbon industrial materials. Canada, Germany, the U.S., and the U.K. have all begun stakeholder consultations to adopt the GPP. They emphasised their commitment to the process at COP28, where Japan, Austria, and UAE additionally endorsed the GPP statement of intent. India, notably, has not made any commitment to GPP, despite being an IDDI co-lead alongside the U.K. Neither does India currently have any substantial sustainable procurement policies for low carbon materials in government agencies or public sector undertakings (PSUs).

Figure 1. Industrial Deep Decarbonisation Initiative's (IDDI) Green Procurement Pledge

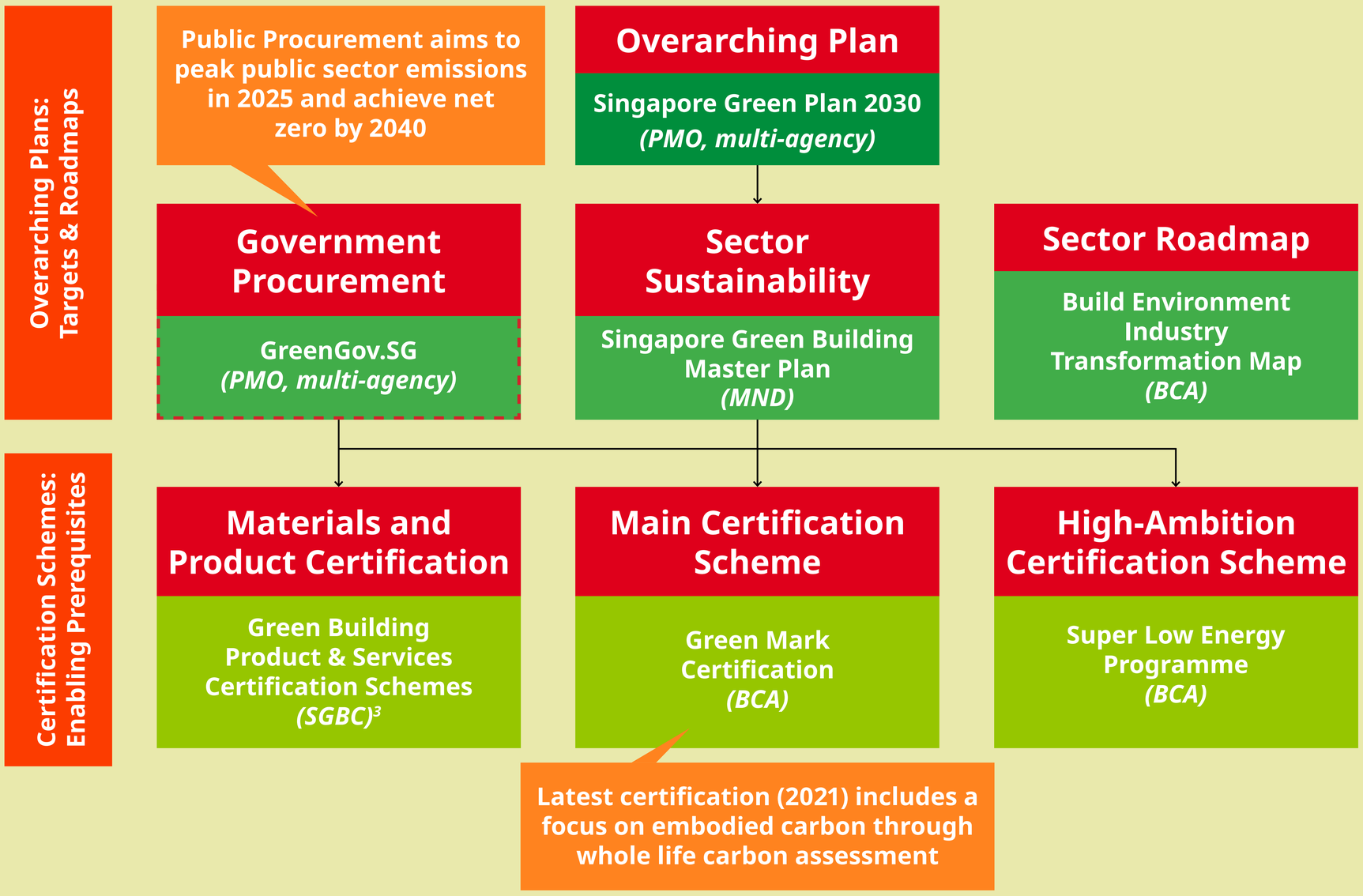
Level 1	Starting no later than 2025, **require disclosure of the embodied carbon** in cement/concrete and steel procured for public construction projects.
Level 2	Starting no later than 2030, **conduct whole project life cycle assessments** for all public construction projects, and, by 2050, achieve net zero emissions in all public construction projects.
Level 3	Starting no later than 2030, **require procurement of low emission cement/ concrete and steel** in public construction projects, applying the highest ambition possible under national circumstances.

Other countries that have yet to sign up for IDDI have still put in place comprehensive cross-agency green procurement policies. In Singapore, for example, public procurement for green materials and mandates for green buildings sit within the umbrella of the Green Plan 2030 and have a separate set of more ambitious targets than wider industry. This is so that government procurement can set an example and the pace, bolstering demand for these products.

1 "Cement Industry Report", IBEF, 2023; Xynteo analysis

2 "Building a New India", Kanvic Cement, 2018

International Examples: Singapore's Green Public Procurement Strategy



Singapore presents a consolidated public procurement strategy involving multiple government ministries and enabling infrastructure, including an overarching roadmap, certification schemes, and an embodied carbon calculator.

Targets for public procurement are more ambitious than targets for the wider industry.

BUILD AHEAD RECOMMENDATIONS FOR SHORT-MEDIUM TERM GREEN PUBLIC PROCUREMENT

Our aim is to outline the preliminary steps the Indian government can adopt as first measures to begin the green public procurement journey. These steps can come with direct financial and environmental benefits, with Stage 1 alone having the potential to avoid anywhere between 232 $mtCO_2$ to 390 $mtCO_2$ per annum. Our recommendations do not follow the Singapore model of a comprehensive, multi-agency effort. Rather, the idea is to propose procurement requirements that can be put in place immediately, to reflect the urgency of getting started.

THE FRAMEWORK

Build Ahead offers a flexible framework that allows for optionality between mandatory or optional strategies, flexibility in terms of the implementing party, which could be state or central procurers, or centralised regulations like the Manual for Procurement of Goods (MPG), or platforms such as the Government e-Marketplace (GeM). The recommendations are also technology agnostic, placing emphasis on emissions reductions, while ensuring other tender technical specifications are met.

Figure 2. Build Ahead Recommendation for Green Public Procurement

Recommended Timeline		Framework	Example *(variable components in red)*	Supporting Infrastructure
Stage 1	**2024**	**Mandate** minimum proportion of material supplied to meet low carbon definitions[3]	Mandatory requirement for 50% low carbon cement, concrete, and steel materials for Category A and B1 projects[4]	1. Sufficient supply of material 2. Clear definitions of low carbon matrials 3. Accepted and publicised EPD self-declaration framework for product manufacturers 4. Recommended LCA baseline 5. Defined emissions intensity thresholds for low carbon to near/net zero products
Stage 2	**2024-2027**	**Provide additional points to tender submissions that include emission intensity baselining or whole lifecycle assessments**, assuming key quality/ technical specifications are met; at minimum for A1-A3 – **in addition to Stage 1**	Option to earn 5-10% additional points in tender evaluation if LCA is included as part of tender submission (either by materials supplier or project developer)	
Stage 3	**2025-2028**	**Provide additional points to tender submissions that include proof of emissions reduction relative to an established baseline,** with % of additional points granted increasing with extent of emissions reductions, assuming key quality/technical specifications are met **– in addition to Stage 1 & 2**	Option to earn additional points in tender evaluation based on proposed % emissions reduction (e.g., 5-10% = 1pt, 10-30% = 5pts, >30% = 10pts) in carbon footprint, with greater reductions earning greater points	
Stage 4	**2030**	**Mandate tender submissions to include proof of emissions reduction relative to an established baseline** and disqualify submissions that do not meet this criteria; Alternatively **include emissions intensity cap on materials**	Mandatory requirement in tender evaluation for minimum % emissions reduction compared to an established baseline; or mandatory exclusion of materials based on emissions intensity cap	

[3] **Note:** Low carbon definitions, in the absence of clearly defined industry definitions, can include PSC and other environmentally friendly materials as outlined in the Ministry of Environment, Forestry & Climate Change (MoEFCC)'s Environmental Impact Assessment (EIA) guidelines

[4] **Note:** Category A1 and B refer to the categories defined within the Environmental Impact Assessment guidelines, i.e., projects above a certain size and expected environmental impact

Our framework recommends moving ahead in four broad stages:

Under Stage 1 (2024), we suggest a mandatory minimum proportion of materials procured meet defined low carbon standards. This initial step sets the tone, encouraging environmentally friendly procurement practices.

In Stage 2 (2024 -2027), which will be an addition to stage 1, the emphasis shifts towards optional measurement and accounting, incorporating emission intensity baselining or whole lifecycle assessments into tender submissions for additional points.

In Stage 3 (2025 – 2028), which will be an addition to stages 1 and 2, we propose rewarding optional submissions of tangible and verifiable emissions reductions relative to an established baseline with additional points. The number of points awarded can increase with greater emissions reductions.

Stage 4 (2030 onwards) should see more stringent regulation, including mandatory proof of emissions reduction compared to a predefined baseline. Submissions failing to meet these criteria risk disqualification. Alternatively, mandatory emissions intensity caps can be applied for materials. This will ensure the market as a whole is shifting towards lower carbon materials.

Overall, these stages create a gradual evolution from setting minimum standards to stringent requirements, allowing the wider market time to prepare, while ensuring substantial, feasible emissions reductions.

Importantly, our recommendations are developed within the context of a proactive industry that is driving towards a net-zero future, alongside the government. Build Ahead, as a business-led coalition, is actively engaging with stakeholders across the construction value chain, including policymakers, certification bodies, and finance players, to support a collective transition. The government will not be acting in isolation. Build Ahead, other organisations, and forward-leaning businesses are developing enabling tools and taking actions to support meaningful decarbonisation.

Examples of how Build Ahead’s ongoing actions will complement the recommendations include:

- Build Ahead’s embodied carbon tool, Build Better, which will allow for easy benchmarking and progress-tracking for all building types in India
- Emissions intensity thresholds will help in defining what ‘green’ materials are, further enabling target-setting and benchmarking
- Continuous engagement with green rating agencies should result in a higher weightage assigned to embodied emissions reductions when awarding certifications
- Continuous engagement with industry to support understanding of embodied

emissions, how to measure and reduce emissions should help prepare and facilitate the transition.

BENEFITS IN ACTION: CEMENT

Using the example of cement, we can examine the holistic benefits of opting for lower carbon materials, in line with Stage 1 of the recommendations.

Currently, the cement market in India is dominated by three types of cement: OPC, PPC, and PSC, shown in Figure 3. OPC, which has the highest emissions intensity, is generally preferred in public procurement.

Figure 3. Cement Types and Market Penetration in India

Cement Type	Description	Market Penetration[5]	Emissions Intensity ($kgCO_2$/tonne)[5]
Ordinary Portland Cement (OPC)	"Regular" cement made with a mix of clary or shale and limestone or chalk (to produce clinker) and gypsum	27%	740
Portland Pozzolana Cement (PPC)	Blended cement made with clinker mixed with fly ash	65%	511
Portland Slag Cement (PSC)	Blended cement made with clinker mixed with slag	7%	340

Adopting Stage 1 of the recommendations would allow for a greater shift from OPC toward PPC and PSC, which in turn would lead to both emissions and cost reductions, as shown in Figure 4.

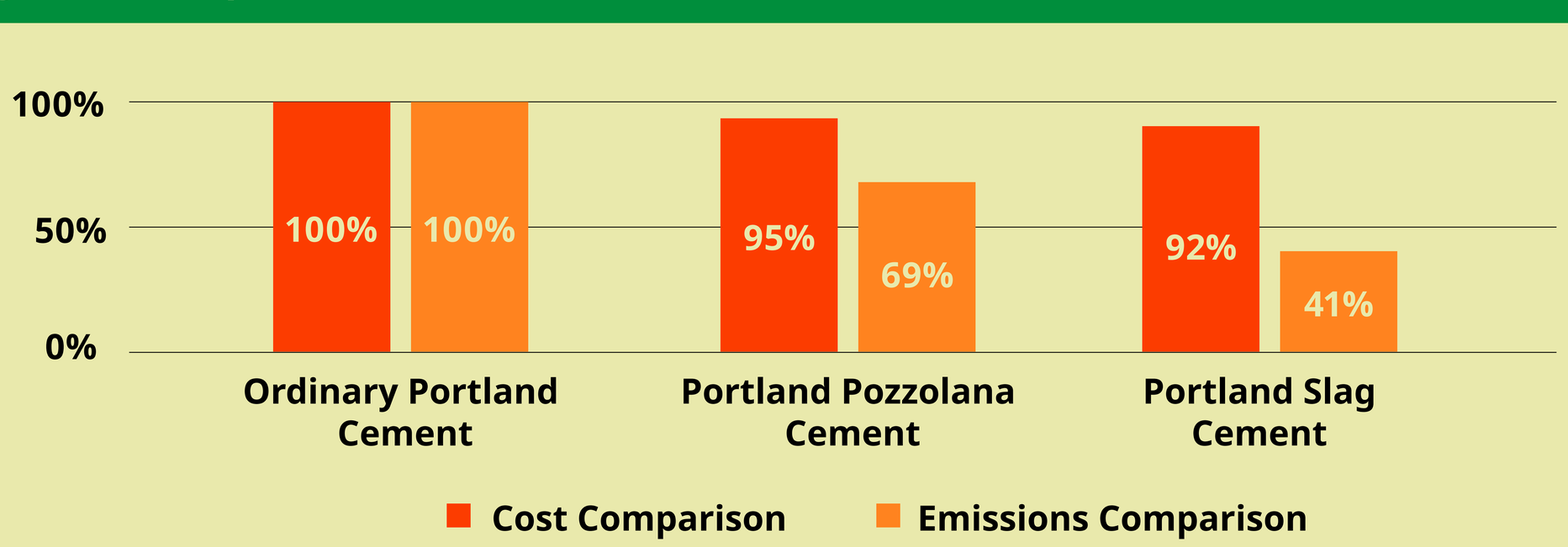
This is because current public procurement for cement is estimated at 160 MTPA, a number that is expected to more than double to 350 MTPA by 2030. Assuming a continuation of the 27% OPC in public procurement, this would result in 435 $mtCO_2$ from OPC use alone. Swapping out OPC for PPC or PSC could result in an emissions reduction of between 135 and 257 $mtCO_2$, an avoided 31-59% of business-as-usual emissions.

In addition, because PPC and PSC are available in the market at discounts compared to OPC,

[5] "Blended Cement – Green, Durable, and Sustainable", GCCA, 2022

procuring these in place of OPC can also result in a cost savings of between 5-8%, translating to savings of INR 30,000 crores to 53,000 crores at current prices.

Figure 4. Comparison of OPC vs Greener Cements



Numerous comprehensive studies further prove the technical superiority of blended cements over OPC in India. These are outlined in Figure 5. In summary, PSC and PPC tend to outperform OPC in terms of long-term strength, water permeability, shrinkage, alkali resistance, vulnerability to sulphate attacks and chloride corrosion.

Figure 5. Performance Comparison OPC vs PPC vs PSC[6]

Cement Type	OPC	PPC	PSC
Description		Clinker replaced with fly ash	Clinker replaced with slag
Emissions intensity ($kgCO_2$/ tonne)	740	511	304
Clinker Factor	0.94	0.65	0.40
7-day compressive strength (N/ mm^2)	43	42	35
28-day compressive strength (N/mm^2)	58	56	49
Corrosion rate – normal water M30 (mils/year)	1.5	0.7	0.07
Corrosion rate M30 – sea water M30 (mils/year)	1.9	0.9	0.4
Heat of hydration	High	Lower	Lower
Permeability	High	Lower	Lower
Long-term strength	Normal	Higher	Higher
Shrinkage	High	Lower	Lower
Alkali aggregate reaction	Less resistance	Higher resistance	Higher resistance
Sulphate attack	Less resistance	Higher resistance	Higher resistance
Chloride induced corrosion	Less resistance	Higher resistance	Higher resistance

6 "Blended Cement – Green, Durable, and Sustainable", GCCA, 2022

Applying these principles to a real-life project, such as the Mumbai Trans Harbour Link (MTHL) Project, we can see the holistic benefits of opting for lower carbon materials at a large scale.

Figure 6 includes 3 hypothetical scenarios for concrete consumption in the MTHL Project. Using our understanding of the amount of concrete used in the project, we have modelled out 3 scenarios with different inputs to demonstrate the benefits of using PSC and PPC compared with pure OPC. The scenarios include a base case, in which regular OPC is used throughout for concrete production; scenario 2, in which 50% of OPC consumption is replaced by PPC for concrete production, and scenario 3, where 50% of OPC consumption is replaced by PSC for concrete production.

Figure 6. Scenario Comparison OPC vs PPC vs PSC in the Mumbai Trans Harbour Link Project[7]

Scenario	Base Case	Scenario 2	Scenario 3
Cement Quantity (tonnes)	351,000	351,000	351,000
Cement Used	OPC	50% OPC 50% PPC	50% OPC 50% PSC
Cost for cement (mn INR)	2,948	2,878	2,826
Project cost (mn INR)	178,400	178,330	178,277
Change in total project cost (%)	*n/a*	-0.04%	-0.07%

Similarly, if we compare a particular mix design of concrete (M40 in this case) for three scenarios, as seen in Figure 7, which includes a base case, in which regular OPC is used; scenario 2, in which PPC is used, and scenario 3, in which PSC is used for concrete production, we can see the benefits of using PSC and PPC compared with OPC, in terms of commercial and emissions impact.

[7] Interview with MMRDA

Figure 7. Scenario Comparison OPC vs PPC vs PSC M40 Mix Design[8]						
Concrete Mix Input Details	**Base Case**		**Scenario 2**		**Scenario 3**	
	kg/m³	**Cost**	**kg/m³**	**Cost**	**kg/m³**	**Cost**
Cement	360	3,024	360	2,880	360	2,772
Fine Aggregate	642	963	637	956	637	956
Coarse Aggregate	13,03	1,303	1,292	1,292	1,292	1,292
Admixture (superplasticizer)	7.2	324	7.56	340	8.2	369
Total cost (INR / m³)	*n/a*	**5,614**	*n/a*	**5,468**	*n/a*	**5,389**
Emissions Impact ($kgCO_2/kg$)	**0.12**	*n/a*	**0.08**	*n/a*	**0.06**	*n/a*

At a total production level (including other materials required for concrete production), PPC- and PSC-based concrete can be less costly, and critically, can result in drastically reduced embodied carbon footprints, with a reduction of anywhere between 30% to 50% becoming possible.

> *"...critically, [PPC- and PSC-based concrete] can result in drastically reduced embodied carbon footprints, with a reduction of anywhere between 30% to 50% becoming possible."*

This example highlights the ease and benefit of adopting procurement requirements, which will in turn catalyse market shifts in favour of low carbon materials, emissions accounting, baselining, and reductions.

It is important to note that shifting towards blended cement is only a short-term solution to reducing emissions in cement and concrete production. We see this as a preliminary and readily available option for the sector, but not a silver bullet solution. Long-term and meaningful decarbonisation will require interventions such as adoption of low carbon fuels, electrification of production processes, novel cementitious materials, and carbon capture. However, for the industry to make inroads on this long journey, strong signals from the government are urgently required.

---

8 "Mix Design with Superplasticizers", Kishore, Civil Engineering Portal, 2014 – assuming M40 mix design

THE WAY FORWARD

India can give the green materials market for cement and steel a major boost by adopting green public procurement policies. The simple steps proposed by Build Ahead can result in significant benefits with minimal disruption to the industry. They will also help India get on track for IDDI's Green Procurement Pledge, joining global peers in reducing the impact of two crucial but emissions-intensive industries.

Build Ahead

WITH xynteo

xynteo.com

MUMBAI
WeWork, C-20, G Block,
Bandra Kurla Complex,
Bandra East Mumbai,
Maharashtra 400051, India

LONDON
17-18 Britton Street,
London, EC1M 5NZ,
United Kingdom

GURUGRAM
The Executive Center,
Level 6, DLF Down Town,
Block - II, DLF City Phase III,
Sector 25 A, Gurugram, 122002