

INSIGHT PAPER

Net Zero is under Construction:
How sustainability-led procurement can decarbonise concrete



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Executive Summary

An evolution of procurement practices is required as Australia moves towards its goal of becoming a net-zero economy.

That evolution will be away from the traditional procurement model centred around cost, time and performance and toward the practice of procuring goods that demonstrate environmental, social and economic responsibility.

This practice of sustainability-led procurement offers perhaps the single most powerful lever to accelerate emissions reductions, particularly in the emissions intensive sector of construction and around the use of construction's most carbon-intensive material – concrete.

A reduction of concrete's emissions is a very big win. The World Economic Forum (2024) says cement – a core ingredient of concrete – contributes 8% of global CO₂ emissions. If the cement industry were a country, it reports, it would be “the world's third or fourth largest emitter of carbon dioxide”.

In Australia, government procurement represents about one-third of the local concrete market (SmartCrete CRC, 2025). This places government agencies in a commanding position to drive the demand for low-carbon alternatives. While there is some progress in this area, particularly in NSW, progress is made difficult by a lack of harmonised policies, standards and incentives.

Similarly, industry and commercial projects account for another third. Should government and industry collaborate deeply on this point, a large part of the puzzle is solved.

In this paper, we discuss insight, advice and case studies from industry bodies and thought leaders in the space, as shared in a recent SmartCrete CRC webinar and elsewhere. We illustrate the very real opportunity for procurement to catalyse action and innovation, and how sustainable materials can be introduced at scale.

The call to action is around the national alignment of procurement frameworks. With the relevant levels of leadership and transparency, collaboration, cooperation and education, as well as the option of investment in tools such as Environmental Product Declarations (EPDs), a roadmap to decarbonised concrete supply chains becomes clear.

Smarter purchasing is an essential ingredient in the recipe for net-zero success.



Defining the problem: The concrete scope

Our built environment can't do without concrete. It is the backbone of almost all infrastructure, including buildings, roads, bridges and pipelines. But the environmental cost is considerable.

Globally, we use 30 billion tonnes of concrete each year, CSIRO says, producing about 2.9 billion tonnes of CO₂, according to Norway's CICERO Centre for International Climate Research and the Global Carbon Project. Of course, most emissions come from the production of cement, from the heating of limestone to create calcium oxide.

In Australia, a typical family home requires 14 tonnes of cement, and a kilometre of freeway takes up to 2500 tonnes, CSIRO says. Our national emissions total from cement production alone, in 2020-2021, was 4.7 million tonnes.

Demand for concrete in Australia is growing, and public procurement accounts for around one-third of all concrete used.

- Government/infrastructure projects: estimated 29 million m³
- Industry/commercial projects: estimated 29 million m³
- Residential projects: estimated 18 million m³ (SmartCrete CRC, 2025)

The opportunity this presents is a fast evolution of the traditional procurement triangle of cost, time and performance to something similar, but with a vital addition.

"Our big question today is how might that triangle turn into a square," says Clare Tubolets, CEO of SmartCrete CRC.

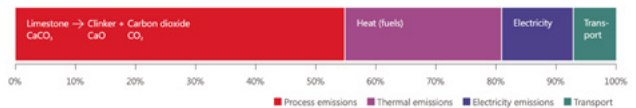
"How might we instead think about sustainability being one of those really core issues that we drive towards in all of our procurement decision making?"

To meet 2050 commitments, the question of emissions must be addressed now. The longer the delay, the more carbon emissions are locked into our infrastructure programs.

Cement and concrete CO₂ emissions profile

Approximately 55 per cent of the CO₂ emissions from cement production originate from the calcination of limestone and are commonly referred to as 'process emissions'; about 26 per cent can be identified as fuel-based emissions, mainly from the heating of the kiln and around 12 per cent are indirect emissions from electrical energy usage. Indirect emissions based on the transport of cement and concrete to the customer are estimated to be 7 per cent.

Figure 2: Today's CO₂ emission profile of the Australian Cement and Concrete Industry



How procurement works as decarbonisation lever

For net-zero success, environmental outcomes can no longer be viewed as some sort of trade-off.

Here's where the value of sustainability-led procurement comes in – it flips the script. If purchasing decisions are driven by emissions outcomes, if the environment is integrated into the purchasing process, emissions success must follow.

In public sector frameworks, this shift is beginning to find traction with the NSW Government playing a lead role.

The Infrastructure NSW Decarbonising Infrastructure Delivery Policy, requiring government bodies to consider emissions across lifecycles and to prioritise low-carbon materials, was released in 2024. It partners powerfully with the Guide to environmentally sustainable procurement from the NSW Government's Department of Climate Change, Energy, the Environment and Water, which mandates a value-for-money approach that strongly considers environmental and social performance.

Why is such leadership vital? The logic is twofold:

1. it sends demand signals throughout the supply chain, encouraging and rewarding greater investment in, and innovation around, cleaner technologies and materials, and;
2. in the supply chain, uncertainty is dramatically reduced when a clear framework is provided.

The problem right now is that consistent and collaborative leadership is not common across all state government bodies and, indeed, across local, state and territory governments.

Procurement models and specifications vary, sometimes dramatically, across Australia.

This fragmentation causes confusion and a lack of confidence in new materials and technologies within the supply chain, placing a heavy burden on industry.

In SmartCrete CRC's Sustainability-led Procurement webinar, Paul Rucker, Holcim's Materials Technology Manager, said it only takes one party to say that low-carbon concrete can't pump, to scare everybody off. Instead, constructors need to work with real data, with good information about the typically excellent pouring and pumping characteristics of low-carbon concrete, and to educate and innovate around any challenges that may arise, just as they do with every other product.

A harmonisation of standards across territories and organisations would also help to remove these barriers to progress, Rucker says.

"From a procurement approach and a sales perspective, this is very important," he says. "We need to understand what the owners' objectives are early, and communicate what is available. For us as suppliers, it's about making sure we know what the potential ... owners of the structures need, and that the complexity of the supply chain doesn't convolute that."

Case studies: Stories from the frontline

There are numerous success stories from the Australian engineering and construction sectors that demonstrate the innovative use and development of sustainability-led procurement in infrastructure and other construction projects.

These first-movers, early adopters and systems builders are vital in the demystification and understanding of technologies like low-carbon concrete, and in the development of new standards and practices around its use.



Holcim: Start where you can

With sustainability at the core of its strategy, Holcim sees that it has numerous roles. One is in evidence-based research and development of new, low-carbon products. One is in ensuring the increasing use of these products, making sure they are available as broadly as possible throughout supply chains. Finally, to guarantee increasing usage of products such as their EcoPact low-carbon range, they are also an educator of others.

EcoPact, now used for general applications on over 150 projects nationwide, offers a minimum 30% reduction in embodied carbon compared to Portland cement concrete. The EcoPact Max product boasts an embodied carbon reduction of 70%.

During SmartCrete CRC's Sustainability-led Procurement webinar, Rocker said, "Low-carbon concrete doesn't need a trade-off between form, function or aesthetic."

Clients can choose various low-carbon mixes for various purposes or appearances. All are supported by environmental product declarations (EPDs), as well as mix calculators and in-field performance testing.

Rocker's key message to the market is a simple one. There are plenty of options available, so start now by doing what you can.

"That doesn't mean you're going to go to zero carbon straight away," he says. "Just go to some level of carbon reduction."

Landcom: Drive change with contract mechanisms

At Landcom's Panorama project in North Wilton, sustainability was a clear focus from day one, including specific procurement requirements.

Embedded sustainability factors included:

- kerbs, footpaths and driveways made with low-carbon concrete;
- site sheds powered by solar;
- recycled asphalt and steel, and;
- re-use of shale and sandstone on site.

Being a state-owned developer of property and land, Landcom has a clear mandate to deliver ecologically sustainable outcomes. Contract mechanisms are playing an important role in driving this change, says Monique Gay, Landcom's Sustainability and Research Officer.

"To test where the market was at, we separated the inclusions into two types," she says. "One was mandatory inclusions, which we knew the market could deliver without limiting contractors submitting for the job. The project team ... needed the reassurance that we wouldn't scare off half the contractors by limiting their choices."

"The second was the comparative inclusions: what do we want to push the market to deliver? These were the

exciting ones, and the ones we used to compare the tender responses."

As they educated contractors and worked closely with councils, and as project crews shared their experiences with new materials, knowledge and confidence spread amongst individuals, trades, businesses and government agencies.

"Dave, the site manager ... pulled me aside after a meeting one week, eyebrows furrowed, and asked, 'What's all this low-carbon concrete stuff you're talking about?'"

"The team had agreed to use a low-carbon concrete product that had a 30% reduction in embodied carbon ... [but] they'd never worked with low-carbon concrete, before."

"Dave pulled me aside again a few weeks after they'd started pouring it, to comment on how easy it was to work with. He could barely tell the difference between the two, between a low-carbon concrete and a standard concrete. He's a big fan, now



Arup: Specification reform will bring results

“Standards and specifications are silent to the use of most or many sustainable materials,” says Lauren Howe, a Senior Material Engineer at Arup. “This silence does not necessarily preclude the use of the materials, but it also does not incentivise it.”

Howe has been interested in the systemic barriers to wider adoption of more sustainable materials, particularly low-carbon concretes. The major barrier, she says, is standards and specifications.

“There is this huge ecosystem of specs and we are trying to work out how to start to make updates,” Howe says. “We are engaging with NATSPEC (National Building Specification) and IPWEA (Institute of Public Works Engineering Australasia), to see how we bring guidance into their requirements, and then we’ll be working with the councils.”

“This is just for low-carbon concrete. I think it’s really important that we start to understand these ecosystems, because there’s not one clear pathway.”

And so, through work with standards agencies and councils, Arup is hoping to enable the adoption of low-carbon concrete specifications at scale. Alongside this effort, they are mapping supplier capabilities, developing harmonised sets of data supported by EPDs, and actively encouraging collaboration across sectors.

“Collaboration is the most important thing across the value chain,” Howe says. “What we’ve found ... is for large projects, setting up a working group of key stakeholders across the value chain helps to really address these roadblocks that we know will inevitably arise. It also helps to provide a bit of a focus to what is the end goal.”

“Of course, this works well for large projects, but there are plenty of smaller projects and different work orders that such a working group is not viable for. And so, this is where trialling on big projects, and then the education coming through into smaller projects, is key.”



Low-carbon concrete: What's stopping us?

As momentum grows, significant barriers remain.

Progress towards a nationally consistent adoption of sustainability-led procurement is being slowed by:

- **Fragmented frameworks:** States, territories and local governments each have their own rules and guidelines around procurement, causing confusion and inconsistency throughout the entire supply chain.
- **Focus on cost:** Making design and construction cost a short-term priority, rather than considering lifecycle value and carbon performance, discourages thinking around sustainability and rewards a lack of innovation.
- **Capacity and skills gaps:** Smaller councils and contractors sometimes lack knowledge around sustainability opportunities.
- **Fragmented standards and metrics:** When contractors are rarely singing off the same song sheet, it is impossible to stay in tune with sustainability requirements.
- **Lack of information:** Some in the engineering and construction space, during SmartCrete CRC's Sustainability-led Procurement webinar, said it would be very helpful to have greater visibility and transparency around the availability of low-carbon materials in various parts of the supply chain, particularly geographic areas. This information, they said, should be updated in real time as availability increases.

Solutions: Mapping the way forward

There will always be barriers. But barriers have never stopped engineers or construction professionals in the past.

So, what are the solutions?

To get to scale in sustainability-led procurement, collaborations between various governments and industry is essential. From there, key enablers include:

- **Tenders must have a sustainability focus:** All documents outlining procurement requirements must demonstrate great clarity around criteria for low-carbon products and materials. Landcom's model, containing mandatory and comparative inclusions, is an excellent driver of innovation.
- **Jurisdictional harmony:** Alignment along the lines of standards, specifications, EPDs and procurement frameworks are essential in reducing complexity, enhancing consistency and boosting confidence and expertise throughout the national supply chain.
- **Funding of trial programs:** On projects in which materials such as low-carbon concretes have been used, people in the sector develop great confidence around those products. Trials and demonstration projects enable this, and greater knowledge gathering, on a larger scale. They help to de-risk adoption.
- **Developing transparent data around sustainable programs:** Arup is mapping supplier capability across the country. In doing so, they will provide greater confidence across all projects. Similar transparency comes from EPDs, and from carbon baselining. The more information available, and the more organised and transparent that information, the more confident engineers and constructors will be around the uptake of new materials.
- **Supporting the upskilling of suppliers:** "By creating an environment where the contractors and the project team felt comfortable to ask questions and innovate, we were able to demonstrate some really great outcomes," says Monique Gay from Landcom. "By the end of the project, contractors and the project team were asking suppliers for sustainable alternatives for all kinds of products, and suggesting further initiatives to me that I hadn't even thought of."
- **Informing and educating the broader public:** Residential builders are keen to use sustainable materials in residential applications, so must not be left out of the loop on low-carbon options.

Call to action: What are the next steps?

We are at a crossroad with a future-critical decision to make.

We are able to decarbonise concrete. We have the know-how and the technical capability. But we don't have scale, alignment or leadership.

What must be done?

Government

- In procurement evaluation, embed sustainability-led metrics
- Coordinate national, transparent reform around standards and specifications
- Incentivise low-carbon solutions and innovation

Industry

- Invest in data and tools that ensure transparency and knowledge sharing, including in the residential and private sectors
- Be present early in the project planning process to collaborate with clients
- Focus deeply on sharing all lessons from low-carbon materials, especially performance data that could assist another project with similar needs

Collaborative

- Support working groups with a focus on sustainability, standards and procurement reform
- Encourage alignment around a common emissions threshold for concrete across any build
- Develop or become involved in projects that could benefit entire sectors – speak with SmartCrete CRC to find out how







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