NSW Department of Education

Industry Engagement on Materials Innovation

External Report | 13 April 2023

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$17.7 billion can do better than entrench what we do today. This investment can engage both government and industry to rethink how we build and operate schools. We need to focus on decarbonisation, equity and resilience. We recognise our responsibility to address challenges and we embrace this opportunity to leave a strong legacy for the next generations.

Anthony Manning, Chief Executive
School Infrastructure NSW

Delivering more value through the significant investment in educational infrastructure

Every day, our teams support more than 800,000 public school students and more than 120,000 employees across 2,200+ schools. How we direct our infrastructure spend will influence communities, ecosystems, and the economy for years to come, and we recognise our responsibility to define what good investment of public funds is likely to mean going forward.

The NSW Department of Education is exploring new ideas for the future – including materials innovation – to optimise the value that is derived from the $17.7 billion invested in public education infrastructure. Our goal is to provide high-quality flexible teaching spaces that improve learning outcomes, meet sustainability objectives and deliver value for money.

As part of the new ideas, we are reimagining the products, materials and methods of construction of our schools.

We wanted to learn from the industry about materials innovation that is underway as well as about the benefits, costs, and obstacles in its way.
The forums held in early December 2022 and the survey open through 27 January 2023 have helped us inform the role we should play in accelerating the development and uptake of more sustainable solutions.

This engagement has reinforced the value of our collaboration with like-minded partners to remove obstacles in the way of more sustainable procurement.

In the spirit of collaboration, we have captured this industry engagement in the short report that follows. We hope that sharing what you told us, what we heard, and what we took away as actions engenders further dialogue with those who have contributed as well as supports others progressing towards similar ambitions.

So far and going forward, we are excited about working with industry towards meaningful progress.

The role of innovation in our scope

800,000+
public school students
120,000+
employees
2,200+
schools

Today

Every day, our teams support our learners and employees across a vast portfolio.

$8.6B
over next 4 years
200+
new schools

1-5 years

- Advancing stated NSW goals
- Aligning with like-minded organisations
- Considering options around procurement
- Sending clear signals to industry
- Removing obstacles
- Rewarding industry innovation
- Achieving measurable impact
- Demonstrating further potential

Approx. 1m
public schools students
Approx. 34,000
upgraded teaching spaces*

10+ years

We are looking to evolve our approach for supporting products, materials and methods of construction that:

- will equip the next generation of Australians for the future
- will provide a return on community investment in education
- are safe for all species through time
- are regenerative
- reflect modern methods of mass construction
- integrate the latest digital technology
- can fuel a competitive NSW industry.

** Delivering school infrastructure. April 2021. Report by NSW Audit Office. https://www.audit.nsw.gov.au/our-work/reports/delivering-school-infrastructure#:~:text=The%20audit%20found%20that%20School,met%20present%20and%20future%20needs*

A focused approach to sustainability

In November 2022 we launched Our Commitment to Sustainability.

We strive to deliver quality education outcomes while protecting the environment, contributing to economic prosperity and helping our communities to thrive.

We have many live examples of sustainable practices already. As a learning community, we will use these examples to inspire, inform and accelerate positive change.

We are embracing the opportunity to shape a positive legacy for our students and future generations.

Adopting more sustainable practices is one of the great challenges of our time. We know high expectations in the classroom drive academic results, so we have high expectations for ourselves to deliver on this commitment.

We are looking to demonstrate our leadership by:

- Supporting staff and students
- Evolving our own practices
- Investing in innovation (Goal #7)

Our vision for the future of materials

We are looking to evolve our approach for supporting products, materials and methods of construction that:

1. will equip the next generation of Australians for the future
2. will provide a return on community investment in education
3. are safe for all species through time
4. are regenerative
5. reflect modern methods of construction
6. integrate the latest digital technology
7. can fuel a competitive NSW industry.

> We are exploring the future of materials innovation because, as a client organisation within the public sector, we recognise our responsibility for creating widespread value from the current investment in public education infrastructure. We are prioritsing this work because of the encouraging evidence that the future could be here sooner than expected.
>
> **Anthony Manning, Chief Executive School Infrastructure NSW**

SINSW Industry Engagement on Materials Innovation:
What you said

Approx **515** total responses from a wide range of voices, incl. the broad membership of both MECLA and LFIA, each hosting a well-attended forum.

The survey met its objectives or reaching manufacturers and suppliers. Responses amounted to **70.5 hrs** of stakeholder time, and **84%** had a positive or highly positive reaction to the department's expressed vision for materials.

The **42** practical suggestions or approaches, products, materials and methods of construction span (we cannot disclose specific brands recommended):

1. **Overall approach** to building (e.g. Greenhouse by Joost: “There are huge possibilities to design in preloved materials”)
2. **Project delivery systems** (Cloud-based platforms: “improved access of information for suppliers”)
3. **Better-performing options** of standard products (e.g. Triple-glazed thermally broken windows, light-gauge steel, low-carbon aluminium)
4. **Methods of base building construction** (e.g. ground screw; 3D concrete printing; dirt on roof instead of foundation; modular framing)
5. **Certified innovative products** (bamboo, hemp, straw and algae-based products; mass timber; vLaminated Veneer Lumber (LVL))
6. **Not-yet-certified products**
7. **Emergent types of material**

Survey Q: For this solution, please rank the following obstacles in order of impact, with the biggest obstacle first.

- **Procurements do not consistently request or rank benefits**
- The cost premium is prohibitive
- Not (yet) available in Australia
- Not (yet) ready for commercial application
- Not (yet) ready for commercial application

#1 obstacle for **30** solutions; #2 obstacle for **8**; #3 obstacle for **2.**
#1 obstacle for **2** solutions; #2 obstacle for **14**; #3 obstacle for **12**.
#1 obstacle for **1** solutions; #2 obstacle for **2**; #3 obstacle for **9.**
NOT the top obstacle for ANY solutions; #2 obstacle for **8;** #3 for **15**.

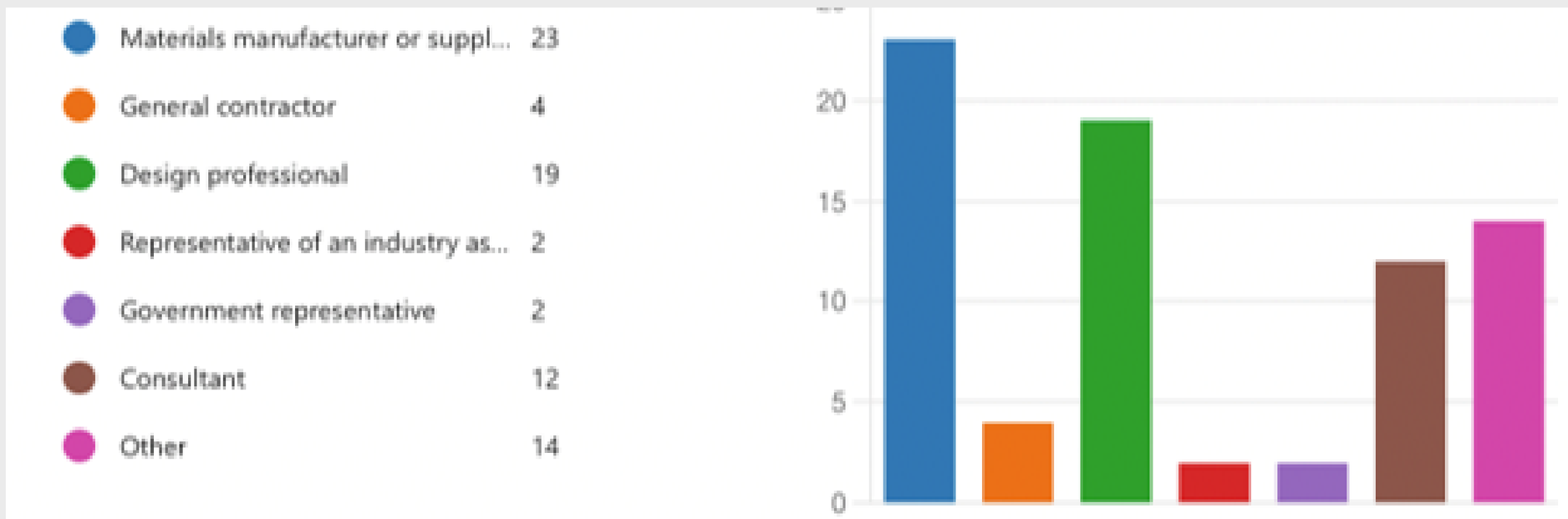

Figure 1: What best describes your current perspective?

Figure 2: How would you describe your overall reaction to the department's vision for materials as expressed above?

SINSW Industry Engagement on Materials Innovation

What you said (cont.)

I'd really like to commend you on the work you've done to get to here and very excited to engage as we move forward. There's an enormous opportunity in government. It's really wonderful to see you looking really holistically at your sustainability opportunities.

I like what you're doing. I think it's great you're engaging. And I think it's very challenging given the multiple different materials and elements of sustainability that you're trying to address.

Keeping assets for longer/ end of life is really important. It's the modular concepts. Wherever it's reversibility [or] adaptability in how you design and how you construct, I think they're really important things because if / something gets demolished or something gets unused after a certain period of time, then you're almost at square one.

Do we need a two-step process:
First short-term to come up with solutions to deal with/use the huge amount of waste that we generate every day through investment in recycling system and mandating use of recycled product in construction. Second: longer term move to alternative materials as we start to reduce the amount of waste we generate in the first place?

Survey Q: Why did you have that reaction? Please be specific about what resonated and didn't.

Responses (a representative sample is supplied below) indicate overwhelming support.

We all need to change what we have done traditionally to provide a better future outcome and it's great to see a government department prepared to explore their options

This will be invaluable in getting examples out there. Education is one of the biggest barriers to transition to building with renewable resources.

Education buildings are public assets, which will be ideal for promoting sustainability to the general public.

I like hearing the Dept engage with industry

As a material scientist teaching and doing research in the built environment I find this as very encouraging and innovative.

Fantastic foresight and sending a very positive message to industry that government means business.

SINSW Industry Engagement on Materials Innovation:
What you said (cont.)

Survey Q: If we could do one thing to accelerate the development and uptake of innovative materials, what would you have us do?

> Instead of looking for the new innovative solutions, I would like to maybe look at the current waste streams that are exiting, perhaps other department buildings with the NSW / what is going to landfill? Look at what proportion of that could be repurposed and reclaimed and reintegrated into the renovation or new builds of the new schools, whether it's recycled timber or breaks or some concrete slab. Probably not that, but maybe some mesh.

> Avoid 'red list' ingredients

> Life cycle assessment of building materials

> The one thing you can do, it's this engagement.

> Publish a policy on what the department seeks as far as innovative materials are / from that will flow all your technical specifications.

> Having more of a consistency of modular / which would then rationalise use of materials.

> Place a clear and significant tender selection criteria of say 10%+ to tenderers (designers and VECI contributors) for use of innovative and sustainable materials (with particular guidance around what is considered sustainable - e.g. low embodied carbon, biodegradable, DfD, repurposed/reclaimed and other circular solutions).

What we heard

You appreciated the engagement and would like for it to continue.

You were not sure that interiors — incl. FF&E — were included in our stated vision. (Good news: they are!)

You overwhelmingly commend our proposed role in supporting the industry in materials innovation.

You'd like to hear what the stated criteria mean in practice, esp. how we define regenerative, where climate actions and circularity fit, and whether we will advocate for and adopt a shared metric for embodied carbon assessment.

You overwhelmingly support our proposed vision for the future of products, materials, and methods of construction.

You’d like to better understand the department's transition to modern methods of construction (MMC), incl. how it will address site- and occupant-specific conditions.

You made several dozen practical suggestions of approaches, products, materials and methods of construction.

You’d like to better understand how the department’s procurement system will define, assess and reward innovation.

As the biggest obstacle in their way of most of those suggestions, you see the need for procurements to request and rank their benefits.

You’d like us to help build up the capacity of the Australian manufacturing industry to meet our stated vision.

You’d like to hear how sustainability is being incorporated across our portfolio.

You hope we work collaboratively with other organisations advancing this agenda and use third-party certifications where suitable.

What we will do next

1

Clarify our intention

- Confirm that all purchases (incl. FF&E) are in scope for the department's stated vision for materials.
- Clarify how our procurement considers whole-of-life costs and innovation.
- Educate about the modern methods of construction (MMC), incl. how the department will address site- and occupant-specific conditions.
- Define the stated criteria.
- Work, collaboratively with like-minded efforts, towards a transparent and shared methodology for assessing embodied carbon.
- Articulate how materials innovation fits within the overall scope of the department's responsibility and its process for moving forward.

2

Identify and progress procurement opportunities

- Collaborate with other organisations advancing this agenda.
- Assess existing product certifications (e.g., Declare, GreenTag, GECA, PassivHaus) for compliance with our stated criteria and accept suitable ones.
- "Support the development of enabling infrastructure for pilot and scale up of circular and sustainable materials":
  - Utilise our Sustainability Innovation Grant to test examples of materials innovation.
  - Identify potential “living labs."
  - Continue, with NSW Government partners, to identify and pursue other ways of building local capability.
  - Progress refinement of our procurement practices.
  - Identify opportunities to modernise project procurement and delivery.

3

Share how sustainability performance is being improved across the asset portfolio

- Include sustainability in annual reporting.
- Continue to highlight successes and lessons learned within the sustainability communities of practice.

4

Maintain industry engagement

- Hold a follow-up forum for all participants.
- Issue a short report to all participants (*What you told us, what we heard, what we will do – this report*).
- Invite participants of this engagement to and otherwise continue to expand Sustainability Communities of Practice.
- Hold industry forums in 2023. In addition to fulfilling Recommendation #4, they would advance Recommendation #1.

Industry Engagement on Materials Innovation

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