

Net Zero Construction Materials: A briefing for government executives and leaders

Thursday 27 May 2021, 2.30pm – 4pm

Event summary

The Sustainable Programs Branch were excited to host a **Net Zero Construction Materials: A Briefing for Government Executives and Leaders** last Thursday at the International Convention Centre, Darling Harbour. The event was aimed at engaging and informing Senior Executives from NSW Government agencies about the opportunities arising from using Low Emissions Building Materials in their operations.

Kate Wilson opened the event virtually - highlighting the linkages between the 'soon-to-be - released' *20 Year Waste Strategy & Circular Economy Strategy* and the *Net Zero Emissions Plan*. She also spoke about the power of collaboration and the importance of Government playing a leadership role to influence the increase in the adoption of low emissions materials in their projects.

The highlight was case studies from the three levels of Government:

- Federal Government with their use of low emission concrete as part of the Melbourne to Brisbane Inland Rail project
- Transport for NSW who are already successful using carbon fibre as a steel alternative
- City of Sydney with an exciting pilot application of geopolymer road base an alternative to the traditional high emissions concrete & asphalt.

This group of Government Leaders complements the recently established industry leadership group - *Materials Embodied Carbon Leadership Alliance* (MELCA) who are working together to address the increase the uptake of these emerging low emissions materials.

The event was a great demonstration of the value of hybrid engagement with 40 people attending in person and 80 attending online from all three levels of Government across policy, program and asset delivery.

More information on these events, reach out to Turlough Guerin, Program Leader, Low Emissions Building Materials at turlough.guerin@environment.nsw.gov.au

How government can be involved by Kate Wilson

- Net zero emissions and waste and circular economy inextricably linked.
- 20YR Waste Strategy is going to cabinet soon – it's renamed the 20YR WASTE AND CIRCULAR ECONOMY strategy.

Program overview by Turlough Guerin

- Current infrastructure CAPEX pipeline \$100 bn, and similar spend for both commercial and residential sectors. This equates to large amounts of embodied carbon (though building materials).
- The Low Emissions Building (or LEBM) Program is all about growing the market for these low emissions (or green) materials. The program is setting up a scaffolding - bringing industry together and setting up a framework to be successful - program ends June 2022.
- Innovation sprints will focus on ways to accelerate the uptake of low emissions concrete over the period following the end of program.
- The LEBM Program is also supporting ISCA rating scheme by digitalising the materials calculator which is currently used in the IS Rating Scheme. The intent is to make it easier for project developers to calculate and compare a business-as-usual build with one that uses low emissions materials.

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- The program focus is to start with and focus on concrete then steel, aluminium, timber/glass
- Service providers to the program are: WWF, ISCA, BlueTribe and Presync
- Stakeholders include DISER, ABS, and Australasian Procurement and Construction Council (AP&CC) (all attendees today)
- There are 4 key stages to achieving low emissions material in government projects: 1. Design, 2. Specify (with engineers), 3. Procure (they will know what can be purchased), 4. Deliver (e.g. taking designs, manage contractors to deliver projects eg build a hospital).

Case study 1 Inland Rail by Jody Finsen

- Inland rail: 13 projects: 7 in NSW. Parkes to Narromine completed last year, 100km rail. Second project: Narrabri - entering detailed design stages. Reduced 750 t CO₂e each year.
- Will use a VAST quantity of materials - to meet the challenge they need to be innovative, engage widely.
- The project is using low /zero carbon materials and delivering a lower emissions footprint
- REUSE of materials. New specification allows for previously discarded soil to be reused, treated and reincorporated.
- Benefits: less wear and tear on roads, less dust. No / very little procurement of virgin materials.
- Resulted in 34% reduction of emissions just from how general fill was handled and manage (i.e. less transport)
- Concrete culverts. There were directly procured >22kt concrete. Offset remaining 7kt carbon.
- Secured an EPD (Environmental Product Declaration) from the concrete supplier who constructed the culverts locally.

Case study 2 Transport for NSW by Harish Srivastava

- Using either recycled materials or LEBM – TfNSW has been doing this for a long time
- Reducing the total quantity of materials reduces carbon emissions as well
- A key statistic: Cement and concrete are the most consumed material following water globally in the construction sector. Concrete is made of cement, aggregate and water. The components can be dealt with separately to deliver improved sustainability outcomes. For example, 1) reduce cement content, 2) replace virgin aggregates with recycled materials, and 3) reduce water (not dealt with in this forum).

TfNSW specs:

- Cement replacement: Allowing use of fly-ash, silica and blast furnace slag to replace cement. Research with CRC is trying to push the amount of this other content up.
- Aggregate replacement: recycled crush glass, recycled concrete aggregate.
- Asphalt replaced with recycled 'crumbed rubber' and recycled crushed glass, steel furnace slag.
- Replacing steel with lower embodied carbon material: GFRP or glass fibre reinforced polymer.

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- NEED a database on carbon emissions - to address the argument / put it to rest that we will use more carbon with these methods than otherwise - they need to log and build the evidence base.

Case study 3 City of Sydney by David Eckstein

- Low emissions building materials are already in use and existing across the Council. Environmental Strategy 2021 - 2025 is being reviewed right now.
- The City of Sydney is introducing the language of circular economy now.
- There are multiple touch-points in their strategy around low embodied materials.
- Geopolymer concrete: moving away from hot asphalt to warm asphalt - this results in energy savings but also easier to apply. Geopolymer trial in Alexandria in Sydney (Wyndham road). Video was pretty interesting – get link from slide deck. It pours like a regular concrete. Stephen Summerhayes from CRC / UNSW connected up David to this
- Toner cartridges reused as asphalt.
- Reconphalt - extractions in stormwater pits reduced because this product strips out the nasties and toxins from the top layer.

Panel session with Abbie Galvin, Anita Mitchell and Teresa Scott

Abbie Galvin, Executive Director, Government Architect NSW

What excites you most about net zero and low emissions materials

- Incredible opportunity for wonderful design innovation and ingenuity. You can do some really interesting things with the product. We can use low carbon material sand they still look ok.
- You have new materials to use that bring new opportunities. e.g. Timber - cross laminated material opens up so much opportunity - keep it dematerialised it's beautiful to be in.
- We were able to add more levels to a building because of the lightness and speed that construction could happen.
- It actually starts with policy (not specification).
- Industry can get working but you need government to be there.

Biggest challenge with uptake of materials?

- If concrete were a country it would be the third largest emitter.
- If people started to be aware of that we'd have a better level of support for change. Our politicians need to be aware of that and their electorates must support it.

How can we address the challenge?

- Design and Place SEPP is under development. We have the ability to embed a series of requirements for low emissions in our building stock and our general environment.
- You start thinking of the systems.
- Make considerable impacts on making a statement of 'We must do this!' e.g. grants policy - 50% of government funded materials will be made of material or a bio-sourced material.
- Paris 2024 Olympics said that any building must be built out of timber as its primary construction material.
- Imagine if we made a statement like that in government e.g. all projects must be x% green concrete.

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One piece of advice?

- Believe in ourselves: we can do it! We have an incredible amount of power among us in government.

Anita Mitchell, Chief Executive, Placemaking NSW

What excites you most about net zero and low emissions materials

- Beautiful materials e.g. sandstone used to be covered by other materials! Now we're celebrating them for their properties. There are no trade offs. Embodied carbon isn't a trade off.
- Add 'Education' to the list of 4 (i.e. design, specify, procure, deliver) - it underpins everything. Barangaroo - committed to the embodied carbon reduction target. That was 11 - 12 years ago. There was NO WAY to measure it.
- It's exciting this work because it's a final frontier. Concrete, steel, glass, aluminium are very difficult to get to zero embodied carbon but this is exciting. It's hard but that requires the BEST OF design and engineers.
- We (government and industry) need to change our risk aversion around standards and products.

Biggest challenge with uptake of materials?

- It's the standards - some of the international, some are Australian standards.
- Principles based standards rather than specificity in the standards. In Australia the culture is only to specify a stronger standard (i.e. we are over specifying). It takes a long time to get this change through.

How can we address the challenge?

- Give people clarity about what you care about. This is what we as government care about. We will judge you on these things (indigenous procurement, low carbon materials etc) Government signal, stretch target - we procure with preferential treatment.
- Step change: London development bids - 20% of criteria was weighted to 'Sustainability'

One piece of advice?

- Stop the 'it's not specified because government hasn't asked for it and therefore the product doesn't exist'. Just try - go out, and send the market signal that we genuinely care. Industry is hungry to innovate, they want to win tenders. e.g. Barangaroo – maximising low emissions materials - ended up connecting with products in Switzerland etc - you don't know what's out there.
- Why not talk about zero carbon steel? These low emissions materials are coming. For example, there is interesting work being done in Scandinavian countries where they are setting up whole towns.

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Teresa Scott, Executive Director, Australasian Procurement & Construction Council (AP&CC).

- AP&CC has reach into all jurisdictions including NZ. Insights into government procurement everywhere. AP&CC is signed up to MECLA.

What excites you most about net zero and low emissions materials

- Procurement for Teresa includes everything - whole of life.
- If we do this right we can use this agenda to support global visibility - use as a catalyst for change for how government does procurement. It's an opportunity for us to change.

Biggest challenge with uptake of materials?

- Juggling the competing policies - procurement is the lever for many project outcomes. All of the procurement strategic priorities are of equal priority - how does a procurer navigate these pressures - SMEs, indigenous engagement, sustainability etc. It's trade-offs. Procurement profession is not particularly skilled / capable in making these decisions. It's a systems issue.

How can we address the challenge?

- Measure back that sustainability objectives occurred and were achieved. That's very important in procurement.
- Many procurement agencies are unaware of what industry has to offer. There is a role for government to let the suppliers come forward - know what the market has to offer. She has circular discussions with people - doesn't want to inadvertently cut out SMEs - we are asking for something that only 1 -2 suppliers can deliver.
- It's a multifaceted challenge and we need to be mindful of this.
- Case studies are needed. We need to shout out that this is possible and we are doing good things.

One piece of advice?

- DO SOMETHING this won't go away

More information

For more information on the event including accessing the event recording, PowerPoint and images – go to <https://bit.ly/NetZeroConstruction>

Contact us

For more information on this event or the program, please contact:
Turlough Guerin, Program Leader, Low Emissions Building Materials at
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Images from the event



Above: Turlough Guerin (Program Leader) (LHS), Teresa Scott, Executive Director AP&CC, Abbie Galvin, NSW Chief Architect, and Anita Mitchell, CEO Placemaking NSW.



Above: Jody Finsen, Senior Sustainability Advisor (LHS) and Heather Barry, Project Director, Inland Rail.



Above: Turlough Guerin (LHS); Damien Ottaviano, Executive Director, Infrastructure NSW; Dr Harish Srivastava, Director Construction, Transport for NSW; and Teresa Scott, Executive Director, AP&CC.



Above: Kasper Sollberger, Senior Project Officer and Alice Cahill, Strategic Delivery Manager and Erica van den Honert, Executive Director, Infrastructure Assessment, all from the Department of Planning Industry & Environment