Tackling Polluting Products and Materials
September 2019

- Good evening. Thank you so much for being here on behalf of the Green Building Council. We know we're really delighted for you to join us today.
I really want to thank Auckland Council and Auckland Conversations for wanting to collaborate with us and work with us to help celebrate World Green Building Week with us.
This week is the biggest week on the global green building calendar, and we've been joined by thousands of other New Zealanders, like you in the room, that have been buoyed by the increased awareness of the need for better, healthier buildings.
You know, in the last two years, we've seen a huge surge in green financing schemes. Gareth Hughes, last night down in Parliament, was mentioning how close our zero carbon legislation was coming. We've also seen hundreds of organisations now sign up to the Climate Leaders Coalition Commitment. And later this week, we're going to see hundreds, if not hundreds of thousands, of New Zealanders (and hopefully most of you in the room), taking to the streets on Friday for the climate strikes.
So it's very clear that the science, industry, politics, and people are all demanding a better, more sustainable, future. So the challenge is upon us to reign in the building and construction emissions. Emissions have risen more than 66% in the last decade and at the equivalent to more than a million cars on our roads every year.
With 20% of our country's carbon footprint coming from the built environment, it's certainly time for us to set a pathway for reducing our climate pollution from our buildings. And that's why the New Zealand Green Building Council was delighted yesterday to launch the zero carbon roadmap for Aotearoa's buildings. And in this, in this document, it sets out how zero carbon is going to be measured and identified, and also how we're going to verify that. And also how it's going to evolve in Aotearoa.

Also yesterday, we launched the zero carbon for building operation certification. And this looks at three key aspects: putting energy efficiency first, followed by on-site energy generation, and finally offsetting. Iit also sets out how those benchmarks are going to be ratcheted up over time. And following this next year we'll be launching zero carbon for new buildings and also family homes.
But also, it's very clear to us that a zero carbon certification isn't a stand-alone tool to achieve zero emissions. Throughout the document, we've identified significant milestones that both the government and industry must achieve to work together to decarbonize our buildings. And these include a stepped improvement to our building code, a significant increase in the transparency around the energy efficiency of our buildings, and also a big call for key government ministries or departments to lead a real transformational shift to greener buildings. And so once all parts of

this pathway are in place our building and construction sector will be zero carbon, and it will be the greatest achievement ever I believe for our industry in Aotearoa. The first step is very simple. All we need to do is measure the footprint of the building in which we work, own, or tenant. And this first step will ensure that by 2050 our buildings will be the zero carbon, special, healthy places that we all deserve.

So obviously, this was a combined effort in putting this together, so I really wanted to take some time to thank some really key people. We travelled the country, and we spoke to, and listened to, plenty of New Zealanders. To architects, to engineers, to building owners and facility managers, to product and material suppliers. And we've captured some really great stories from people that are acting now and taking significant steps to achieve this, and together we set a realistic pathway for achieving zero carbon buildings. So a huge thank you to everyone that's involved and those stories we captured.

To Argosy, Bayleys, Precinct, Warren and Mahoney, and Resene. Thank you for supporting this work and ensuring that it gets done. And to EECA, who may not all agree with everything in this roadmap, but they've certainly been the stewards of the neighbour scheme and brought it to New Zealand. And also to Temperzone and Bayleys, every day the Green Building Council is encouraged by your support and your own commitment to the cause. We thank you for that. Also to the Enviro-Mark Solutions team that we've worked alongside that's with a hugely passionate, inspiring team.

It's been an absolute pleasure working with you. And to our own team at the Green Building Council, it's been a tremendous few years getting to this point, and everyone worked so tirelessly to the cause, so we can't thank you enough. I know our CEO, Andrew Eagles, is very disappointed to not be here tonight.

So climate change is our greatest challenge. And by joining together and acting now, we can tell a new story. A new story to New Zealand businesses, to other sectors, but just as importantly a new story to property sectors around the world. You know, by working in isolation, we may result in survival, but if we work together, we can move beyond survival and into prosperity. That is a big challenge, but we are going to do it together. So I really encourage you to pick up this document. There'll be copies available at the back of the room tonight before you leave, and just see where you can start to join in the challenge.

So this brings me to the rest of the evening. You know, we identified that not all the solutions are going to be easy, and they may involve some really difficult challenges. But we have to accept these challenges and deploy solutions very quickly. And throughout this week, we've been debating various solutions. Last night, down in Wellington, looking at peak electricity demand. Tomorrow in Christchurch looking at fossil fuels. And tonight the challenge of tackling polluting products and materials.

I certainly don't think there's anyone better than can lead this discussion. He doesn't need much of an introduction. You know, as a regular public thinker on numerous topics including deep sustainability, business, economics, innovation, creativity, and entrepreneurship not only from a New Zealand context but a global context. You know, his thinking on why we do business and how we evolve our business certainly challenges, inspires, and creates real space for transformational dialogue. So, Kiora Rod, I welcome you to lead this forum.

Good evening, and thank you very much for joining us for this evening's discussion and about this particular topic about tackling polluting materials and building products on our journey to a zero carbon economy.

And also greetings to people who are joining us via livestream, and thank you very much for being with us virtually. And I'll explain in due course how you'll be able to get questions to us through Slido, and I'll come to that in a few moments.

It is indeed, as Jo said, quite an extraordinary week around the world, it being World Green Building Week. And needless to say, it was obviously perfectly timed for the UN's Climate Summit which started yesterday in New York and already very memorable moments from that. Our prime minister did a fine job laying out New Zealand's ambitions, where we have some strengths on these issues, and where we have some needs. And the overwhelming appeal she made that we need to be able to share those ideas and trade products and technologies and the like around the world to make that happen. But of course, probably most memorable of all, was the wonderful look that Greta Thunberg gave Donald Trump as he walked by which I think is, should be wonderfully etched in all our minds. That he was there not to talk about climate, but to address a freedom of religion event that he had asked for and called for is rather difficult thing for me to try to unpack, and I won't even try.

Our great opportunity though, here in New Zealand, is on our journey to a zero carbon economy over these few decades ahead, and to make substantial improvements and changes environmentally, economically, socially, and reinforce so many of our cultural values in all of this. And I just wanted to give particular thanks, and pay tribute to, for the New Zealand Green Building Council for its work over the years, but particularly for the roadmap just released yesterday. And for designing a whole week of events around the country of which the panel discussion last night in Wellington, tonight here in Auckland, and tomorrow night in Christchurch, are part of that.

Last night we had a very good discussion about how to meet the peak demand for electricity through very big efficiency gains, but also making sure we do that through renewables as well. And our panellists there were very clear that there is a daunting series of interlocking issues there, whether from competing incentives, i.e. the generators love peak demand cause that's when they make their big profits, but the lines company hate it because that's when they have to have the maximum investment to meet that peak demand.

So at the moment we are really quite at sea about how we bring those disparate and competing parts of the electricity supply and demand picture together. But out of it there was some very thoughtful, very encouraging contributions from the panellists. All that was recorded, so once that's available on the Building Council's website I would encourage you to look at it.

Now, in terms of tonight, a very simple format. I'm about to welcome up four terrific panellists giving us four very different, but again very complementary perspectives, on the complicated issue we're discussing. Then, after they have presented for five minutes each, we will get into a discussion. Now, because of the size of the sell out audience here, we won't have a chance to get microphones around to people who have got questions. So what we're going to do is to use entirely Slido. So if you will get our your phones and go to slido.com, very simple process. You will see a login's required to get you to the right meeting, and so for this one, it's #BuildingLife with a capital B and a capital L.

Then Jo and Lena will be likely moderating the questions coming in to sort of arrange them in a useful order for us up here to work our way through, but of course please, please do be looking at the questions as they're coming through. They might spark a question, an additional question you might want to ask. But crucially you can also upvote questions, and so that's a very big help to me to try to choose the questions which are most relevant to you to put to our panellists. I won't go through those questions literally from the most popular on down. I will move around a bit, and I'll also be throwing in a few of my own questions. And I know we won't have a chance to deal with all the questions that come through, but we have a hope that we can collect all of those questions and provide answers for some, or a good many of them, again after the event. And then after all of that, I will simply summarise and thank everyone and close the event. And then at 7:00 I'll close this speaking part of the event because then will be more time for drinks and networking afterwards.

Just a little bit more housekeeping. I've got some additional thank yous in addition to all the sponsors that you see coming through on the screen. Particularly Auckland Council, the Auckland Conversations partner, Southbase Construction and design partner, Resene, and all Auckland Conversation programme supporters, and I'm sure that's a large factor in the turnout tonight. We'd also just like to encourage you to believe in democracy and act on democracy, and of course the local election voting is now open for postal ballots and closing on the 12th of October. And we'd like to encourage you to take part in that. Voting's very quick and easy, well at least until you get to the health board, that's a bit of a mind bender. Just rank them in your order of preference, it's as simple as that. So, please do engage, because the quality of our local politics, our local government, is crucial to this. I would just add my own personal note to this. I'm a great fan of the work that Generation Zero does in many respects, but particularly in the interviews it does with candidates and their ratings of them as they have done in past elections too. So you'll find that a useful guide. One last thank you, I turned up on my bike just as I thought it was about to rain, and I was very delighted to see this canopy being put up outside by Bike Auckland. Hands up, people who availed themselves of the valet bike parking. Yeah, fantastic, yeah. Well, so thank you to Bike Auckland in particular, Fiona and Shawn out there, for that.

A few health and safety things. Should there be the need for an evacuation there will be an alarm sounded, so please just follow the instructions of the venue staff out through those exits

at the back and assemble out in Aotea Square. And smoking, this is of course a nonsmoking venue. If you need to smoke, please do that outside, but not near the bicycles. Sorry, I just, strange juxtaposition. Bathrooms are located in the foyer by the internal staircase, and should anyone need first aid, there are first aid assistants amongst the venue staff.

And so, that's all the housekeeping, and now if I could welcome up our four panellists, and once they've got them all seated here I'll introduce you to them. Come on up, all four of you, and then we will go straight into the presentations.

First of all, it's my great pleasure to introduce on the far side of the stage from me Jeff Vickers who's the Technical Director of thinkstep in New Zealand. And Jeff's been embedding sustainable thinking within organisations for well over a decade and working across sustainability assessment, strategy, and innovation in very complex life cycle businesses such as in the building and agriculture transport and electronic sectors. And he's worked with such organisations as Fletcher Building, New Zealand Steel, Downer, Lenly's, and the European Commission. So a big hand for Jeff please, thank you very much indeed.

Next to Jeff is Helen Jenkins, who is General Manager of Sustainability at Fletcher Building. Helen's been, is a sustainability professional specialising in carbon reduction, particularly in infrastructure and the building material sector, and is a very strong advocate for embedding carbon reduction initiatives within existing strategies. So over the last 10 years, Helen's worked across a number of sectors such as road, rail, and utilities for companies or organisations such as Network Rail and Anglian Water in the UK and Auckland Airport here in New Zealand, and of course now at Fletcher Building. So, a big hand for Helen please, thank you.

And next along, next to Helen is Shawn McIsaac, who's the Director and Senior Building Enclosure Engineer at Oculus Architectural Engineering. So a specialist of course in enclosures, whether they be windows, walls, and roofs of buildings of all types. Shawn has very wide experience and that he has been putting to great use here in New Zealand since 2016. So a big hand for Shawn please, thank you very much indeed. You might have spotted his t-shirt, "make less CO2." I'm not sure it has quite the same ring as "make peace not war" or "make love not war" but maybe we'll get there on our journey. Not tonight, it's a longer term project.

And then next to Shawn, it's my great pleasure to welcome Sally Grey, who at Auckland Council is the manager of premium building consents. So Sally came to building consents through managing the weathertight litigation issues for a very good few years. And before that was an in-house legal council for several Auckland companies. So she's been very deeply involved in how much work it is to put things right after they've gone wrong. And I'm sure that very much shapes her thinking these days about how to build right from the very beginning. So a very big hand for Sally please, thank you very much indeed.

So I'm going to hand straight over to Jeff. I'm going to nip into his seat rather than loiter by the door here. Over to you, Jeff. Thanks very much.

- Thank you, Rod, for the kind introduction.

- So, Tonight I want to talk to you about a couple of public reports that we have recently released. So thinkstep is an organisation that works to help companies and other organisations succeed sustainably, and one of the key ways we do that through is trying to work out what matters. So we use a tool called life cycle assessment and materiality assessment to try and work out where some of the big hot spots are and then to identify strategies to reduce them.

So in the last sort of year, year and a half, we've released two public reports on the built environment. The first one was focused on quantifying kind of the significance of the built environment in New Zealand, the carbon footprint of New Zealand, and that's where you sometimes hear this 20% number being quoted, that comes from one of our early reports and I'll kind of get to that in a moment.

And the next report I want to talk about is one called Under Construction which released last month and sort of demonstrates the potential for building products and building materials to be decarbonized looking at it from a supply side.

So I'm going to probably try and dance around a little bit while I talk. I hope it doesn't make any of you dizzy, but it gives me something to do with my feet. Okay, so what I want to do first is just sort of highlight some of the context for our work.
So back in 2016, 2017, there were a series of reports released on New Zealand's carbon footprint at a national level. And there was one well known one by the Royal Society, one by Globe New Zealand, and another one by the Productivity Commission, the first of that being the issues paper and those reports talked about the built environment, but because their focus is very much on what we produce as a nation they are really focused on energy generation, for example, and this big bold category of industry which produces all of our stuff which goes into lots of different places.
And so what those reports commonly said is that the built environment contributes sort of 2% or maybe 5% or maybe 8% of our carbon footprint looking at energy only. But it was very focused on operational emissions. It didn't look at, and deliberately so, it didn't look at the impact of making materials.
Those emissions that we would refer to as embodied emissions or upfront emissions, those things that are typically hidden, involved in making the materials whether that's steel, or concrete, or the cement used to make the concrete or the timber products that we use, or whatever it happens to be. So those embodied or upfront emissions are what we wanted to investigate in a bit more detail. And so in 2017, 2018 we started trying to quantify what those emissions were, and separating them out from these big groups of, you know, energy, industry,

you know, waste management. And so, the first thing that you see here is this is the kind of traditional view.

This is New Zealand's greenhouse gas inventory. You can see a big number there for energy, and of that about 5% of the total number comes from the built environment. But if you look at that in a different way, and you consider what we consume as individuals, not what we produce. So we also account for the carbon embodied in trade. The things that we import that we don't make. And that's across the board, not just in buildings, but also importing cars and textiles for example. And the fact that as we, as New Zealanders, and we as a nation, are a net exporter of carbon through our agricultural products in particular, exporting dairy products, exporting beef and lamb, etc. You know, those products we export about 90% by value.

So what happens when you look at things in terms of what we consume? Well, we've got an ability to change it as a consumer or as a business. Our carbon footprint as a nation shrinks, so you can see it goes from about 17 tonnes of carbon dioxide equivalent, a very sexy unit I know, down to 13 tonnes. And what you can see is a complete shift in how things sort of stack up.

So all of a sudden, the built environment, rather than being this kind of token 5% within energy use and then kind of some part of industry that we can't quantify it becomes about 20% of our carbon footprint, because the whole carbon footprint shrinks, and we're focused more on what we're using. And if you break that down even further, where does that 20% come from? A big chunk of it is actually from materials. And I need to caveat that, that it's also the materials used in infrastructure. So it's in infrastructure and buildings.

But you can see these big numbers here, materials and also imported emissions in terms of things that we bring in to this country that we don't make ourselves. And some of those things are professional services and things too, it's not just materials, but some of it is certainly the materials themselves. So what this shows is that in New Zealand, in our local context, embodied emissions, the upfront stuff, the stuff that's built into the buildings before you even get into them, those kind of hidden emissions, those matter in New Zealand. They really, really matter.

And there are, you know, in this report it was about 50%. In specific buildings it's not that high, maybe it's 30% or whatever, but the point is is that they really matter in the New Zealand context because our energy mix is already quite clean. We've already decarbonized our energy mix to a large extent. It was already quite low carbon. We use a lot of hydro, a lot of wind, geothermal. We are a little bit unlike other countries who are still using a lot of fossil fuels to produce their electricity.

And so that makes the New Zealand context a bit different, and it means we're a little bit further ahead on the embodied emissions game, because for us it's more relevant already right now, and importantly those emissions are being emitted now, whereas the emissions across a building's life are being emitted over a whole period of time.

You know, the building might last 60 years or 90 years, whereas the embodied emissions are mostly happening now when the thing gets built. And so, what can we do about it? Well, we looked at another piece of work that we released last month. It's titled Under Construction, and we showed that we can reduce those emissions by 40% by 2050 by building, by producing our building materials in a smarter way.

You know, if you look at where the hot spots are, in terms of the built environment, you know, the big ticket items are things like concrete, steel, aluminium, and certain other materials also pop up depending on the context like paint and plaster board and other things. But those materials, you know, as well as in certain contexts timber, are very significant from a carbon footprint perspective.
And so, we can reduce that by 40% if we design our materials and building products in the right way, if we change the way we manufacture things, and if we decarbonize the production of materials. And this is very much a supplier side focus, but if we also work on consumption and sort of a demand side and build buildings in a better way, use fewer materials to start with, focus on choosing the right materials, then we can have a kind of win twice situation where the materials to begin with are really low carbon but we're also using fewer of them.
So, two of the points that the report highlighted which aren't shown here are really the need for collaboration and for innovation. Innovation to drive down the impact of materials, but collaboration throughout the entire supply chain to really encourage the uptake of them, because if no one's demanding them they won't be produced. And if specifiers aren't specifying them they won't be produced. And if building product manufacturers don't have long term supply contracts in place perhaps, for example, they can't justify the investment to overhaul their manufacturing equipment. For example, when they always have to compete with imported product. And so I think, you know, collaboration and innovation are two things that have to go hand in hand to achieve these kinds of reductions, and that saving of, you know, 40% in the embodied emissions is equivalent to about half a million cars off the road permanently. Because we're building these buildings every year, we can take the equivalent of about half a million cars off the road if we go down this path.
And you known, finally I just wanted to put a link to the report out there. You can download it if you're interested. You can also download our earlier report and find out a little bit more about how we can potentially decarbonize New Zealand's built environment together. So thank you very much.

- Thanks. Thank you very much indeed, Jeff, for stepping us through that. And those are certainly very encouraging targets for us to go for in the coming years. Over to you Helen. A big hand for Helen please, thank you very much indeed.

- Good evening everyone. So I'm going to pick up on some things that may become the theme of the evening actually.
Thinking about where we could make some big shifts in the actual production of building materials. There's an aspect of making what we build buildings out of more sustainable, and there's also a need to look at, what are the kind of shifts we need in the construction industry itself? So, one of the areas we really need to focus on is lower carbon materials, more sustainable materials, and lower carbon materials.
And as Jeff pointed out, the carbon that's locked inside building materials can be a little bit hidden. So a really big lever to get to more sustainable materials is actually doing a life cycle assessment of, you know, what you're manufacturing that then goes into a building. And it

certainly, with Fletcher Building, it's a huge focus for us to have Environmental Product Declarations that actually identify that, and in fact starting with the difficult end of things.
So we have those in place already for our cement, insulation, wood products, and some of our steel products. But really intend to roll EPDs out for the entire product line that we make because they do two really important things.
One is that they would point to the areas where you are having an impact and therefore can improve internally as a manufacturer, but secondarily, and I think more importantly, and this is why I'm a huge advocate for doing this more widely within the industry. If you really know the impact of a building product when you're at that early design stage and you have the opportunity to optioneer, you have the opportunity to choose a different range of materials, it's only that life cycle analysis of the materials that you're choosing that will let you make a decision that's genuinely better in terms of design.
And that leads us on to another point that Jeff made, which is that the better materials part of the problem, it does need innovation, and we need innovation with an agility of building specification and standards that allows for that innovation, but we absolutely need to maintain technical and quality standards for building. So those few things really have to work in tandem.

Also, in terms of the kinds of shifts that could be made in the wider industry, there's another part of the puzzle that fits into better materials and better design, which is looking at doing more design up front, so more 3-D design. Designing something in the virtual world before you design it in the real world. It's much, gives you much more scope to optioneer for better products if you're building something digitally than if you're building it physically. It's cheaper and it's faster.

So using, making more use of 3-D design is an area where New Zealand really can expand. And then flowing on from that also, is other ways of constructing. So making more use of modular construction, by which I mean sort of building entire components of the building offsite in a manufacturing kind of environment where you get very, very good consistent standard of quality, and also you get the benefits of generally using far lower, far lower materials used per build than building when you build onsite. So they're two very powerful levers we can use. Design it, design it digitally and build it, build it offsite to the extent that that's possible.

But all of those parts of the picture, so having better and more sustainable lower carbon materials, having smarter design, more optioneered design, and then, making more use of the most recent construction materials. That really requires collaboration across the whole of the construction industry. Designers and specifiers and constructors and end clients.

And it's really that, I guess that shared vision, those shared targets, and the collaboration that is, that is what we need to make the shift that we all want to see, and actually to get the outcomes that we all want to see. To get our 40% by 2050. So I guess we're here because as an organisation, and I'm here personally because I'm very excited by the opportunity to be part of that, that shift. As some of you will know, we're in the process of getting our science based target verified. That's a 30% reduction by 2030, a 50% reduction by 2050. And also very core to

what we want to do as a building products company is look at the life cycle analysis of what we sell to try and be a part of that, part of that collaboration and part of that, part of that journey. Thank you.

- And thank you very much indeed, Helen, for suggesting some very powerful pathways by which we might be able to progress these issues. And now I hand over to Shawn. A very big hand for Shawn, please. Thank you very much indeed.

- Hi everyone, and hi people at home. I want to talk about the crisis happening in front of us. It's ignoring science, and it goes beyond just climate. It's, it's kind of everywhere through our culture right now. I don't know why that is.
It seems that recently there's been more and more of it happening. We see it every single day. I'm an engineer, so I get to look at science, I get to look at products. I get to make evaluations based on science and physics. And then I go to a design meeting and suggest a product, and the first question I get asked is, "Has it been used in New Zealand before?"
I don't really understand why that happens. I think it's a fear. I think it's a little bit of trying to direct blame elsewhere. It's trying to keep your hands off of, off of the pie, so to speak. But I think if we don't, if we don't stop that kind of mentality, we're not, we're just going to be stuck where we're at. We've got scientists telling us we need to, you're not a scientist, Jeff, are you? Yeah, so Jeff's got some scientists that work for him, probably. They're telling us we need lower carbon products. We need to build with less carbon.
We've got Helen's companies building lower carbon products. We've got those to use. Then I've got to go and convince Auckland Council that that new product that we've got is going to be fit for a purpose maybe for the first time it's ever been used before. So until we start to change this mentality of questioning things, it has to be, has to be have had 10 years of track record to be used, we're just going to be stuck doing the same thing we've been doing for the last few decades.
We've got a wonderful research branch, actually. Brand's does some amazing science and research, and for as much flak as I give them, they actually do have a lot of really good things coming out of there. The really big problem is, it's been around for 30 years, and a lot of their research is a footnote at the bottom of a policy paper that happens 20 years later. So I think we need to start listening to the science, we need to start looking for solutions that have track records from overseas that we can borrow. We need to start adopting those ideas. Cause it's not a very big country, guys. I come from Canada. So it's not a very big country. Lovely country, I love it, but if we're going to do this in a rapid, sustainable fashion very, very quickly, we've got things we can borrow, we can bring in, and then people like myself that can evaluate it, and explain it to Council, and get building consents. That's all I had to open with. I'm looking forward to questions from everyone. I see there's lots of questions coming in, so thank you very much.

- Thank you. Thank you very much indeed, Shawn, for getting us going on that, particularly from your perspective as someone designing buildings, and using materials. And a very good point

there about Brands. And on to Sally, please. A very big hand for Sally. Thank you very much indeed.

- I'll just sit. Thank you. I have a few notes, because unlike my fellow panellists, I don't work in this area all the time, and I want to keep on track and provide information of interest. And it's a privilege to be on this stage with you all. I made some notes during the week of what I wanted to say, and then I read the Newsroom article yesterday on the Green Building Council Report, and I thought, "Job done."
It really covered everything that I thought needed to be said from me. For those of you who haven't read it, it was, it made a call for an amendment to the building code as a primary tool for change. I agree.
It called to introduce building energy labels. I agree.
And it called for market action. And for that, I agree too.
As most of you are aware that Auckland Council as a building consent authority operates under the Building Act and the Building Code that is contained within regulation.
We receive, we assess, we approve, we inspect, and we certify building work against the Building Code.
When I looked through the Building Act, the purpose makes reference to sustainability, and mentions ensuring buildings are designed, constructed, and able to be used in ways to promote sustainable development. Cool. And it's also mentioned in the principles in section 4.
But there's no mechanism for us to actually enforce that. So, it means if we receive an application that demonstrates compliance against the relevant clauses in the Building Code, we have to approve it. It may contain nothing about sustainability. It may have the worst polluting products. But as a building consent authority, we go tick. So, I think if we want to change, we have to change those regulatory settings.
From a synchronicity of timing, earlier this year MBIE released a consultation paper that covered five key areas of building reform. I was at a talk recently where minister Salesa indicated that the amount of work to deliver on all five key areas was enormous, and they were likely to be prioritising two for more immediate delivery, and one of those was modern methods of construction. So I could see some real synchronicity in what we all want to see happen.

When I read through both the consultation paper and the feedback summary, there's not a lot around sustainability to be honest. It's very much focused on durability and safety, and on the back end of decades of more of leaky buildings I can understand that focus, but it does strike me that it's the ideal time to really be promoting these more sustainable principles into the construction of our buildings.
In terms of opportunity, Auckland Council approves more than 20,000 building consents every year. This year we will exceed 24,000 of which 14,000 will be new builds, so to me that is, you know, lots of potential. I spoke to one of our key, well, we have a number of high volume building developers in Auckland, and I spoke to one of them to understand what might be some of the barriers to driving more sustainability in the buildings they build outside of legislative change. And the feedback to me was that consumers are very price sensitive.

There's a lot of interest in sustainability and how it is built, and how it's designed for future reduced environmental impact. But there's no appetite to pay for it. So, it struck me that timber and concrete and steel may not be glamorous enough, and the money's really put into those more glamour products like bench tops and bathrooms, and that's where I think the legislative change is, we need it to make that kind of consumer difference.
I would say if you are a manufacturer or an importer, and you are manufacturing or importing a product that has a better environmental footprint than something on the market already, don't lose sight that you should be investing and ensuring it's tested to the appropriate standard, it is appraised or it's certified. Because that makes it a lot easier for designers to specify. It also makes it a lot easier for us as a building consenting authority to approve.
Now, to probably preempt a question that might come through, can we prioritise some work over other work?
Of course we can. Auckland currently has approximately 45,000 houses fewer than we need, and currently that's our priority. Council has a multi-faced role, I guess you could say.
I know I've got some colleagues from our waste team here, which is one aspect. Council's also an owner of many buildings. And I've been advised that this next year we will set a green asset standard for council and community facilities, and we will track and report infrastructure carbon as part of Auckland Council's emission inventory.
Council also gets involved in policy development and has a stewardship role for both the development and support for communities. And one key role we can do to deliver that for Auckland is to encourage growth, both in a compact nature, and near public hubs, public transport hubs to get people out of their private cars.
Now I want to finish on two random observations. While Auckland is becoming to a degree self-regulating in the size of houses it's building because of the price, the average size alone for a standalone house in New Zealand over the last 17 years, every year has been over 200 square metres and for 10 of those 17 years, has been 230 square metres or more. And it kind of begs the question, if we are serious about carbon and carbon emissions and reducing them, is that okay?
And my second observation is the New Zealand Building Code only requires joinery and facades to be designed and manufactured to last for 15 years, and for structural elements to last for 50. Is that okay?

- Thank you very much indeed. Thank you for making some very pertinent judgements and observations there. And putting out that incredibly important point at the end there about the very short time frame that we are designed and building, or creating products for, whether it be 15 years or the 50 years for the structural elements, let me just start actually at that point across the panel. Is there good evidence that shows the economic value of designing and, buildings, and creating products that have a longer life than we are currently tending to build in New Zealand? Any takers on that?

- We can, are you going to ask Auckland Council what they think about the, about that? Listen, if you build a building and have to rebuild it 10 years later, you're using twice the carbon. You're

using twice the amount of money to build that thing again, and maybe you build it wrong a second time, and you're rebuilding it the third time. The most sustainable thing you can do is build a building that lasts a long time.

- Yeah. Any other, Jeff, from your perspective and the sort of analysis you do.

- Yeah, I don't know if I can always comment on a cost from a cost perspective, but certainly it seems that, you know, building it frequently would be very expensive. I mean also, from my experience as well, is that if you, if you design, say a roofing material or a cladding material, particularly for a multistory building, and you make that perform poorly, so that it needs to be replaced regularly, you know, health and safety regulation is the way it is now. It's actually incredibly expensive to go up there and replace a roof for example, because you have to have all the scaffolding in place, all the cranes, everything set up. It's a very expensive exercise. So certainly from a life cycle, you know, environmental life cycle assessment perspective, it makes sense to design things that last. But certainly also I would say to not to make them last necessarily indefinitely, because we know that buildings do get pulled down, so we don't want to make things that last too much longer than they need to last. So in the New Zealand context a house typically lasts about 90 years, and a commercial building about 60. So there's no point designing a building, a commercial building, that's going to last for 500 years potentially, because it might not be fit for purpose, and you've kind of over engineered it as well. So then there's a balance to find there, but I would say certainly 50 years for structural materials and 15 years for cladding is far below what our buildings are currently being turned over, at the rate they're being turned over at, so that sounds very problematic from a, you know, from a building perspective.

- Off the top of the heads, do any of you on the panel have any international perspective on that in terms of the sort of expectations in other countries about longevity of materials and structures? Any sense of that?

- Certainly not from the point of view of standards and specifications, but in both commercial building and infrastructure there are two international movements which are relevant to this one is design for deconstruction, which is, I would say arguably not necessarily the place to start, but at least it's looking at the, you know, the end of life fate of that building if it is rebuilt. But I think the other, and again, this is only a part of the question that we're asking. There's also a look at, particularly in terms of structural and foundational elements, the ability to test and reuse existing foundations. And this is in areas of the world where there's, you know, very dense urban environments. So it's not necessarily as relevant to New Zealand, but the thinking in that, rather than assuming you have to design everything including the structural elements of a building from scratch, there's a movement to say, are there ways you can incorporate testing, fit for purpose testing, for those foundational elements and reuse them for another building that goes on top. I suppose one thing I would add a little bit further to Jeff's point, is that, I think certainly talking about the building fabric, absolutely longer design life seems advantageous. We

generally, because of the efficiency of the systems within the building, there are potentially earlier break points where it would make sense to upgrade those for energy efficiency reasons.

- Thank you. There's actually a related question here on Slido, so thank you for the questions on Slido. Please keep them coming. And the question is, "Should retrofitting old historic buildings "be given more carbon credits "than building new with all new materials?" With all due respect to the questioner, the question of carbon credits is a problematic one in terms of a mechanism for doing that, but the sense of the question though is a really important one. Should there be virtue rewarded for retrofitting and using existing buildings?

- I mean, from my perspective, there's certainly value in retrofit, but you don't want to go too far. So, you know, there's always things that are more cost effective. It's very cost effective to do ceiling insulation, for example, and underfloor insulation in older buildings, whereas to do, you know, wall insulation you have to remove all the cladding and things first, or remove the internal wall coverings. And so I think it all depends on the type of building, you know, I live in an old house build in 1904. I'm never going to make that as airtight as a new building. And so, I want to stay in that house because I really like it, but at the same time, you know, building new would actually give you much more opportunity to make that building much more airtight. You know, you're just never going to achieve quite the same results with retrofit. So I think, to an extent, it makes sense to prioritise, but I think there has to be kind of cut off points where you say, this far is far enough. At least, that's my perspective.

- So we've, I'll respectfully disagree. We've got some good examples of retrofits that have achieved Passive House Standards, which have achieved very high levels of performance. When you look at the cost of, let's say you've got an existing window that you want to replace. If you look at the whole capital cost of that window, the payback period's very poor. However, if you're replacing that cladding or that window because of another reason, like it's a leaky building, your opportunity to go back with a higher performing product, you look at the incremental cost of going from a base build, base building code product, to something higher spec, that actually has a decent payback period. That's something we could actually calculate, and it's probably less than 10 years. So we've done a number of projects in Canada that have seven year payback by spending 10, 20, 30% more during that retrofit process, and just being smarter about how we apply those products. So, exactly right, though, just doing it for a pure energy perspective doesn't make a lot of sense, but to your point, when there is the opportunity to replace that element, going to the next level it makes a lot of sense.

- And I would agree with that. If you're retrofitting anyway, put in the best stuff you can. You know, if you have to replace the cladding, put in the best insulation you can, because it costs very little, and it has a massive, massive difference, so I agree with that.

- Thanks. There's a, in my own mind, there's a related question down the bottom here. I'm sorry that you're, the screen you've got in front of you is a bit too small. But it's about incentives. That

was looking at old buildings. But so, this question is, "Will zero carbon buildings be given favourable treatment "with council i.e. Free processing services "to create incentives to the public "to shift their choices?" Is that a subject that's ever come up in discussions, Sally?

- We have many people who quite like free building consents.

- Let me take that question elsewhere in the panel. Would that be a useful incentive?

- I can tell you without a doubt that our company will give you a much lower fee if you are targeting a better building. We're right now, you've got about three days left, we're offering to do Passive House certification on large projects for 50% of the fee we'd normally charge you. We've had a number of people jump on that option. It doesn't cost a lot less, so there are a number of designers, there are builders, there are engineers, there are people out there that if you are a client, and you want to do something better, you will be rewarded for that in the fees. So I can't help Council. They can't, they don't have much power either. But there are certainly people in the industry that are very interested in helping you.

- Thank you. Let me move on to some materials question. There was a very interesting one which has now dropped off the screen, cause at that point it only had one vote, but I'm going to go to it anyway. Oh, there it is. Oh, it's now got eight votes. From Jerome, "Firth Concrete has lower embodied carbon "than any other concrete globally. "How can it reduce it more?" Firth is a Fletcher company, isn't it? Can you tell us about that very low carbon concrete, and how that happens?

- Yes. I won't dive into the technical details. I guess the, the fundamental difficulty with the cement and concrete, which is really the driver of emissions if you like, is that, in rough terms, about a third of it is related to the energy that you use to produce the cement. And therefore where you have alternatives, so for example, we use quite a bit of biomass, and are moving towards also some other alternative fuels next year for the Golden Bay Cement plant, which is, I think, the 30% reduction in coal use that Jeff talked about. It will probably get us to a 40% reduction. But that's only a third of the impact. The more difficult two-thirds is that, inherent in the process of making cement, the chemical process itself generates carbon. So to get a big, really, to truly get low carbon cement, you have to work out alternative materials that can give you the same performance but aren't what we typically use to make cement. And that's the technical challenge. It's one, in fact, that we're putting huge amounts of research into at the moment. So the lower carbon, so the reason why locally manufactured cement in New Zealand has lower carbon, is because of the energy part of the equation, and that's great. But it, you can only address a third of the carbon emissions through that route, so you actually have to to go through it, you really have to look at the product, the chemistry of the product itself. So hopefully that wasn't too confusing an explanation. But it drives from using, yeah, using alternatives, alternative energy mixers, to--

- Can I just drill down a bit further in that, cause I'm really interested in the Fletcher experience here. Do you want to venture a rough idea of time as to when that research might come to fruition? And does that give you an economic opportunity in terms of the technology to create a business out of that internationally? How's this looking in technical and economic terms?

- I would say that the issue with any sort of innovation is the scalability of it, not, not necessarily the straight technical issues. But I mean, it's active research for us at the moment, and certainly various alternatives exist globally. I wouldn't say they're necessarily large scale. But we have to find something that's relevant to our local environment in terms of the alternative materials you could use.

- Thanks. So, yeah, please do.

- Build on that as well. So, for concrete, if you're making it from Portland cement, typically about 70 to 80% of the carbon footprint as Helen was indicating is from the cement itself, so most of the impact from concrete is from the cement. Makes up only about 10% of the mass, but a very high part of the carbon footprint. The reason, the key reason, for Firth's low impact is because the Golden Bay cement that they're using is substituted 30% of the coal for biomass, and then they're going to increase that significantly more by using tyres, which may not sound that green a fuel, but when you're substituting coal, tyres actually burn extremely well, and they also contain a portion of natural rubber, which can be considered carbon neutral. So you know, that's a good news story, but really if you want to bring down the impact of concrete further, you have to be looking at what are called supplementary cementitious materials. So getting the cement out, or at least some of the cement, out. So you can actually have material, like a, they're called geopolymer cements, that have no actual Portland cement in them. They're made from waste products of the coal industry, for example, like fly ash and waste products from the steel industry, ground granulated blast furnace slag, and so they use those materials and some additives to create a cement free concrete. But in the New Zealand context, we have something quite unusual. We don't have a lot of fly ash, cause we don't have coal power stations, our cement mill doesn't produce the right type of slag to use. What we do have though is an abundance of volcanic ash. And so, we have the opportunity to substitute about 30% of our cement with volcanic ash from predominantly the central North Island volcanic plateau and that's already underway, so both Golden Bay Cement and HR Cement in Tauranga, are already actively exploring the technology. It's been used in the past to build some of our dams because it makes incredibly strong concrete, and I think for me that's the greatest opportunity that we have in cement and concrete in New Zealand, and I think that will have a really significant, it'll reduce the carbon footprint by another sort of 25% at a concrete level.

- These are encouraging stories, because big dynamic in all of these, enormous transformations to a zero carbon economy, is the push back from vested interests, i.e. people have a technology, and they're trying to maximise their return on it for as long as possible. So, across the panel, what's your sense of how our building material producers here in New Zealand are

responding? You've offered some encouraging stories there about innovation, but what's that balance between a real appetite for innovation versus trying to milk the existing technology and assets for all they're worth? Helen needn't answer this question unless she wants to, either personally, or on behalf of Fletcher.

- I can say that I've been finding it a struggle, trying to get a manufacturer who's got an existing revenue stream that they rely on, and they've got a existing customer base who's buying that product. Trying to get them to abandon that product and sell something else has been a real struggle. Thermally broken windows does my head in every single day. It's a quarter inch plastic that's stopping, that's using 30% of the energy. If we just had a very simple, this very simple solution, and it just hasn't gotten market viability for some reason. So, yeah, I fight it every single day. It's very difficult to get manufacturers to push a new product because it takes away from their existing revenue base.

- One opportunity I see is that as a nation we have a lot of ageing plant, like manufacturing plants. A lot of them were built in the '50s, '60s, '70s. They're getting old, and they have to be replaced. And so I see that as a significant opportunity, but it's kind of like the retrofit point that was brought up before. If you have to do it anyway, you might as well do something kind of great. And so one opportunity we have, you know, is to replace, cause, you know, when we're talking about embodied emissions a large proportion of that comes from thermal energy, the stationary heat. So it's from burning natural gas and burning coal, from whatever it happens to be, to produce the high temperatures needed to manufacture stuff. We also have things in New Zealand like geothermal steam, for example, if we can relocate, plan, at the right time to make use of that geothermal steam, we could bring our carbon footprint down. If we use things like hydrogen and other alternative fuels produced from, electricity for example, and we do these things at the right time when the plant's being rebuilt anyway, we can then, we can then use that opportunity to kind of build in the technology we need. And I can already see that happening. Can't, I can't give specific examples because they're confidential, but there are companies, large companies in New Zealand, who are looking at new plant and are specifically considering this now and actively choosing where they put their plant to maximise the use of the resources that we have locally, which is very encouraging, I think.

- Thanks. Helen.

- I think, so, so, to your point, I guess you'd ask yourself, you know, why is this product not necessarily a good product, and it may very well be the energy mix that's used for that product. And I kind of think of them in sort of three tranches, if you like. There's sort of the easily renewable, electrifiable, level of energy input to a product where I think most of the low hanging fruit is probably, they're all, I think most of the efficiency is already built in. Then there's sort of a middle tier, or sort of, medium to low temperature process heat. And now there are more technologies becoming commercially available and, sort of at an industrialised scale, where you can potentially electrify some of those natural gas sources or coal sources. But then, the final

problem is really high temperature process heat where there isn't necessarily an alternative, so you're really just trying to look at a source of that heat that's simply lower down the carbon impact scale. So, I think it's a mix of solutions because of the nature of the manufacturing really determines what solutions are available. But, we are talking, you know, primarily about embodied carbon, so in fact the energy that you use to make that is generally going to be a significant source of it. So yeah, working your way sort of up the hierarchy of what can be renewable or electrifiable, and then, if you're into, at this, at this point of time in technology if you're into a fossil fuel source, thinking of the best one that that could be. However, another point is to, for manufacturers looking at new plant. Thinking about what technologies may come on street in 10, on stream in 10 years, is also something that we certainly factor into our planning, that, you know, something may not be achievable now, but it makes sense to design a new plant in a way that can adopt that technology in a period of time.

- Can I just take this one stage further. We've focused this discussion on materials quite heavily in this last little bit, around the energy component of that, and making sure that energy is as clean as possible. But is there a greater goal here, that there are some wonderful products out there that we know about or could be coming, that are far less polluting. Not just in carbon emissions terms, but more sustainable overall. But deliver not only that lower impact to the construction stage, but deliver real operational benefits over the life of the building, not just on energy, but in other environmental impacts. Is there a real synergy between the nature of that product and the nature of its performance in the building?

- I think what is, I think what you're getting at, or what I interpreted it as, or just what I want to say, one of the two, the earlier kind of question about how do we reduce carbon, concrete's carbon footprint further, is to stop using concrete. We've got other materials that can do the same thing, or better, but it's, you need a design team, you need a client, you need everyone on board from the start, with that in mind. That needs to be a design goal. And if that's not a design goal for your building, if your goal for the building has nothing to do with carbon offsets, you're going to end up with a big, heavy concrete building. Which costs more. The big, heavy buildings cost more. We build a lot of three story, four story, five story precast buildings in Auckland which are really heavy. And when there's an earthquake, heavy buildings take more foundation work to resist those loads. If you have a lighter structure, you have less concrete, you have less cost. So we need to think about the impacts of yes, we have a different durability criteria we need to think about versus concrete and timber, but there's always knock-on effects that we're seemingly ignoring, so let's do the best we can to reduce the production part of concrete. You can't replace concrete. It's got its place. But at the same time, if you're building a four story building, let's think about, can we do it out of timber. If we're doing a six story building, can we do it out of timber? Ye, we can. It's been done the world around.

- Well, far higher than six stories. And we're in the process of, we're planning to plant a billion trees. Far too many of them are going to be radiata pine, and that's going to be a useless thing to do if the radiata pine is only shipped offshore as logs to be used for pallets and scaffolding in

China, where all that carbon is then re-released. So it seems to me, there is this incredible opportunity for New Zealand to take that radiata pine, which is not a great timber in itself, but through engineering solutions turn it into a building material that sequesters the carbon, and therefore people who use that should be rewarded for that in some way other than just not being pinged with the carbon emissions tax.

- Right, you set me up perfectly. This is one of my big things. Radiata pine grows so, so fast here. The problem is once you cut it up and make it into timber, it's pretty lousy to build framing out of, but it's wonderful to manufacture into other things. So it's the perfect building material if you're going to use engineered timber. CLT, glulam, parallel strand timber, any of these products that require extra effort to go into them are in huge demand globally. Huge, huge, huge demand globally. You can't get enough of them. And we're sitting in this climate that is just perfect for it. We've got a tree, like you said, we've planted way too many of, and it'd be a real shame to turn them into pallets 25 years from now. Why don't we turn them into really good, really sensible, very smartly constructed buildings.

- So what went wrong in Christchurch that so few buildings were built that way, and the vast majority of the rebuild in Christchurch is tilt-slab concrete panels? What went wrong there? How did we lose that fantastic opportunity? How do we make sure we don't lose it again as we continue to build out and renew Auckland and other built environments around the country? What went wrong in Christchurch? How do we stop that happening again?

- What I see in the market right now is there's not enough supply to, to meet the demand for engineered timber. So you don't have the expertise and the designers familiar enough with the timber products, and it's partly, partly this idea that we have to treat every single piece of wood that goes into our buildings to make them durable. We think keeping water out of buildings would be a much better way, and that's what most of the world does. So I think that in order to grow a mass timber industry here, we're going to need to borrow some wood from somewhere else for a while, get used to how we use it, how you design with it, and then slowly over time start to build some factories. Find some places that are doing some mass timber at scale that we can start to take over that kind of industry. So that's what's missing right now I think in the market in that adoption.

- Maybe if I could add to that. I mean, we do have a reasonably good engineered timber industry in New Zealand, so we make glulam, we have been making CLT, cross-laminated timber up until recently, although I think XLam is closest plant and Nelson is in the process of closing its office and building another one in Australia. They've already built it. So, you know, those products are made here. We've got a very big engineered timber industry, and for those of you who are interested the Wood Processors and Manufacturers Association will be releasing an environmental product declaration in the next week or so that will cover engineered timber if you're interested in finding out the kind of impact of that in the New Zealand context, it'll cover all those products. My, my sort of thought to your question on Christchurch is that it's all about what

people are familiar with. You know, in Christchurch there was a lot of pressure to get things done quickly. I know it didn't quite work out that way in the end, and people still kind of felt that it was all too slow, but I think they felt it would be even slower if we introduced new things that people weren't familiar with. And so I think that familiarity, the standardisation to the points made earlier around, you know, what's, what's been properly fire tested and fire rated, you know, is it performing to the Building Code requirements. If it's a new product, has it been properly tested, what is the acoustic performance like. There are so many kind of open questions, and we don't have a lot of experience. That's slowing things down. We do a lot of work with Lendlease in Australia who are building mid-rise timber buildings and looking at their life cycle performance, and I know from talking to them that, you know, it's sort of these Building Code type requirements. Making sure that everything ticks all the boxes that's challenging, and they're actually having to import product from Austria and Europe because, you know, it's gone through all the compliance testing, it's a more familiar product, even though there are things manufactured locally that they can't really use cause it doesn't tick the boxes here. So I think there's a bit of a learning curve there, and over the next few years I think that learning curve will be kind of, we'll move up it quite quickly, and then you might start to see more sort of novel forms of construction, be it timber or other things.

- But sticking with the familiar, or incremental shift that moves us slightly on from familiar, is a dreadful fate for, not just in this, but across all of the enormous transitions and transformations we have to make. So how on earth do we get people beyond the familiar and help them have help them innovate far faster and with greater confidence and greater success in building materials so we can get some actually transformational change in this? How do we do that?

- Science. You, innovation is science. It's the practical application of somebody's come up with an idea, put it through some tests, come up with a product that is innovation. It's science, it's coming up with an idea, testing it, and then building on ideas from others, so, back to my opening kind of statement, until we start trusting the science, innovation becomes very, very difficult.

- My feeling is that there will always be a sort of a lead time for innovation though, in this context, you know, you're building buildings that last 60 years or 90 years or 100 years. We've just come through the leaky building crisis. We can't afford another one. You know, and so, we have to be, we have to be confident in what we're doing. But what we probably can do better from is learning from international experience, because something that's come up before when we were chatting as a group earlier is this is very sort of, has it been tested in New Zealand, does it work in New Zealand. And yes, we do have some specific New Zealand conditions, you know, geothermal, we, you know, we had to deal with seismic performance, we have to deal with the fact we're very coastal and that corrodes a lot of metals, etc. etc. There are some specific things, but we're not completely unique in the world in having those things either. And so I think that we probably can learn a lot more from international experience.

- And one final thing that will help where it's appropriate is getting back to offsite construction, if you think about if you build an entire building element, or a component of a building, you can actually test the component, which gives you an ability perhaps to be, to, you know, to use more innovative materials, because in fact you're testing the performance of potentially an entire floor of a building, an entire structural element, so that may be a way to be more innovative with the materials because in fact, it's the performance of the element that gets tested regardless of, in a sense, regardless of what it was constructed from.

- I think the challenge that we do see is that we have innovative ideas, we think we know how they'll work, but we can't actually explain it to Council. So say, "Hey, this got used in Belgium, "and it worked fantastic. "We don't know why, but we'd like to use it in Auckland "for this building." So you go to Council, and say, "Hey, we wanna do this. "It worked over here." And they say, "That's fantastic, "but we don't have the same Building Code." So that's, the challenge is the seat that I'm sitting in there's not very many people that actually can translate what we want to do in new innovative products into a language that complies with the Building Code. I'm sure you see it all the time.

- What would help you, Sally, in trying to connect up these drivers and these opportunities from a consents point of view? How do you bridge that gap with Shawn?

- Shawn tells us how to do it. I'm joking a little bit. We do have to assess both the design and the products and systems selected against the relevant clauses of the Building Code. If you can't tell us how that design is going to perform or that system is going to perform, we can't approve it. And the lower buildings, the under 10 metres, there's a lot of scope around the testing and the appraisals. And the higher buildings, often that information is extrapolated out into how it might perform and I might receive, or my team might receive a report from the likes of Shawn using his science, looking at the evidence, and the test starter, and to tell us a very coherent story around how this particular design complies. But I think, and it might lead into some other people's thinking, how can we do this as quickly and as cheaply as possible. And I have to say when I hear cheap and quick it worries me about, what about the quality? But we work on a time and attendance basis, so the more complete and quality your application is, well you're telling us the story very robustly, and align it with the Building Code. The less time we spend on it, we spend a lot of time asking you for information. It either hasn't been supplied, or it's not clear, or it's very generic. It's not specific to your particular development. So, all of that stuff provided to us up front really, really drives efficiency and then it drives cost down.

- Thanks. The most popular question I think relates very well to this line of discussion we've been having. And the question from Peter is, "It's all well and good setting targets "for low carbon construction. "What incentives or penalties are there for developers "to build beyond New Zealand's minimum standards?"

- I don't think currently at the moment there are. There are certainly not penalties.

- Certainly not penalties. The big incentive by going beyond the Building Code, or, you know, not following the acceptable solution and actually thinking about what you're designing is it's more likely your building's going to be pretty good. You won't end up in court. That's what we always tell people when we're designing a building, is if you're trying to follow a recipe for a single family home to build a seven story apartment building, it's not going to turn out the way you think it is. You might have to actually think about these things and come up with solutions that we know can work and we can prove. So to me, that's the big incentive is if you spend a bit of extra time looking at better products, looking for more innovation, spending some more time in design, you're less likely to get sued.

- Is, Jeff.

- I see very few incentives or penalties at the moment. You know, I don't really see much happening in the New Zealand context, but I think there's huge opportunity in that as well, because we're starting from a low base. If you look internationally, you know, you see government driving it through public buildings for example. You know, we will require that all new buildings in Germany, and France, and the UK. All new public buildings over a certain dollar value, a million euros or whatever, require a green building certification. They require a certain, you know, things around having environmental product declarations, or embodied energy requirements, or whatever it is. And you see that a lot more coming from government and sort of leading by example. You also see it from large corporates specifying they want green buildings, because that's where the new corporate head office is. And so if you look, even across Australasia, look at Australia, Sydney, Melbourne, etc. where all the sort of CBD real estate, most of that's green building rated. I think office towers have got over 90% coverage, Green Star in Australia, because everyone's competing in that area for the best, most sustainable, nicest place to work, etc. etc. So there's a bit of healthy competition that goes on there in the corporate context. And I think in New Zealand we did have requirements, but some of them have gone away. So there was a requirement within building new schools, there was I think 8% historically allocated to green building, and I think that got kind of taken away is my understanding of it. So there've been, there's been a bit of come and go but there are probably opportunities with, you know, whatever KiwiBuild becomes, with, you know, large scale building projects, that we could do more.

- I got another penalty, actually, is there's a lot of expensive stuff we do in this country that doesn't add any value to the building. My big one is nogs in walls. There's studies going back to the '70s saying that's not required. It's not required in 3604 framing, yet we still do it. So there's, there's penalties to building the way that we do. Is that you're wasting money on things that don't matter.

- Thank you, that sounds like a very productive line of questioning to pursue but I won't, cause I'm trying, I'm going to move on through some more of the popular questions from people with

us here. "Auckland Council has declared a climate emergency. "Have there been, "have there been no tangible moves "in the area of building consents "in light of this declaration?"

- You're right, the Council has declared a climate emergency. I referred before about Council's role as a building owner and the steps we're taking. I referred to Council's role as a policy maker and its encouragement of more intense development around public transport hubs. I also referred to our role in our waste programme. But Council as a building consenting authority is a regulator, and we can't just throw the regulation out because we like the idea of sustainability. As I think I also mentioned, we receive an application with literally nothing sustainable about it at all and it meets the Building Code and we will approve it. Which is why we believe the Building Code settings set by the central government regulator need to change.

- Just, totally hypothetical, I've not thought about this before, but given there's been a declaration of an emergency, if there was identified to be a particular piece of infrastructure or a particular building that was particularly vulnerable to King Tide or whatever, would, and there was a desire for really speedy action on that, would the Council from a consent point of view fast track that, or not?

- There are provisions under the Building Act for works done under an emergency. And they are essentially legalised afterwards. Consent's sought from the building consent manager first, but the actual consent sought after it through the certificate of acceptance programme. So there definitely are opportunities for genuine emergencies, whether it's coastal inundation. I'm not sure you could describe that as an emergency now where the life and safety of occupants are threatened by that building being in place, so it's a matter of degree.

- Okay, thank you. Next most popular question is about limiting waste materials. "How do we limit waste materials "of which there can be huge volume from, "during, "from the actual building construction process?" Any takers on that? Cause that would indeed help reduce the embodied carbon in such a, a project.

- It's certainly part of it. And to give you some really depressing news. New Zealand performs way below global good or best practise on, on construction waste. So it's actually a big area for, for improvement in general. I would say, but you know, because we know that materials lock up a lot of carbon, then clearly waste minimization is going to, is going to reduce the carbon associated with building. However, it's something that we don't, we don't really have the incentives to track it particularly well because it's not really part of the, generally speaking it's often something that you don't actually have to report in regulatory terms. So I think there are some sort of, there are levers, and whether that's changing the way that, changing the way that waste is dealt with at the, and to require more regulation of it all, so I suppose, you know, many of you in the room will probably be familiar with a really successful UK initiative which was just to increase the waste levee by a certain percentage over a period of time, which let everyone in that industry, for example, know exactly what they were going to have to pay in addition the next

year if they didn't reduce their waste. I'm not suggesting that's necessarily the lever for here. I'm more suggesting that we actually don't really have built in incentives for waste minimization, so those companies that are doing it, and those waste providers that are doing it, many of them doing an excellent job, are really doing that from their own initiative. So I think, you know, recognising that it's part of the issue, recognising that, you know, there is an embodied carbon component of waste that we're just not seeing, is probably the first stage. But also looking at ourselves critically in the mirror and saying, you know, we pride ourselves on environment, our environmental ethos, and actually we are batting way below average on this particular issue.

- I think there's some opportunities in the, in the modular space and the standardisation of some typologies. We're definitely seeing a lot more people asking for products coming from the GIB factory, for instance, to be made to the length that's required for the building, so you don't have an off cut that goes to the, to the waste. And a lot of the manufacturers will do these sort of things for you, you just need to talk to them. Or, it's, it's understanding that if you order a sliding door, ranch slider to, you know, 100 mils larger than, than something else, all of a sudden that creates a waste and something in the background, they have an off cut that they can't use. And so I think there is, there's room in the industry overall to kind of come up with some standardisation. Then we can start to say that, hey, we've got windows that are 200 millimetres, it's kind of the rough opening size we have, then everyone in the industry can start to optimise their supply chains to deliver things in those increments of size. Right now, we're ordering windows is horrendous. We're ordering things to the eighth of an inch, which is, you know, three, four, five, six millimetres. And those get measured on site. So the more we can start to push industry toward standardisation, standard floor plans. House in New Zealand is doing a great job with us on standardising floor plans. So they have now got some typologies that they're going to roll out around the country. Now all these suppliers can start to gear up and say, hey, we've got this many windows to build the same size, we can start ordering stuff to match those sizes. So that's a part of, part of this.

- Thank you, actually, Helen there's a related question from somebody specifically to you. "Does New Zealand have skills and capabilities "to do modular build? "Current examples are all shipped from overseas "with cheap labour."

- Yes, we do. There's a change in thinking required. You sort of have to take your construction hat off and put your manufacturing hat on, because essentially that's what you're doing. You're manufacturing a very high quality product that performs in a certain way to a specification with, you know, the, the modular construction that we do, the investment we're making. The tolerances are incredibly tight, the accuracy and the quality is incredibly good. So we do actually have that skill set. Maybe when we think about it, we're not seeing the skill, because we have a strong manufacturing sector, so maybe we're not seeing that, that ability to do it because, because we're looking at construction skills. However, one thing I would say, in addition to that, is design to standard sizes, Shawn's point, modular construction, tight tolerances, but it's, there's a lot less bespoke work associated with that. It's, you know, it's faster to construct. So it

actually unlocks a lot of capacity in the sector in and of itself. And I'm absolutely confident that it's a skill set that we can, that we can develop.

- [Rod] Thank you.

- I'm pretty bullish still on, on KiwiBuild despite all of its troubles in the early days. If you think about when, when government announced the policy of KiwiBuild, and I don't want to dwell on KiwiBuild, but what it did is it set up a supply chain where a factory could, a company could make a business decision to set up a factory to do prefab knowing that there was orders coming. But that's a two to three year timeline to set up a factory to actually deliver. So what we're seeing in the market now is for the first time, these factories that are New Zealand based are now producing those buildings. They're now coming out of the factories. So the one and three year, one and two year targets for KiwiBuild may or may not get there, but you look at the three year target, I think we're going to eclipse that, because we have these factories now starting to deliver at an incredible scale the country's never seen before.
We do still need people to put them together onsite. I think that it's not a huge leap from what you normally do. But it is a different way of thinking. You're not a carpenter anymore. You're an assembler. You're putting together a kit of parts onsite. So, I think it's coming very quickly, and we'll look back five, 10 years and wonder why we did it any other way. That's an area where our central regulator MBIE is really recognising gaps in the Building Code, and while they haven't really focused on sustainability, those modern methods of construction like prefabrication are definitely on the agenda.

- And I just, one tiny, final point. I would keep your eye on the current, and the future, infrastructure construction in Auckland to see what this looks like on a large scale, because that's a model for major infrastructure investment is to build it offsite. So, the CRLs and the Waterview Tunnels, I would look at those examples.

- And the disappearance of the Slido questions is my cue from the organisers that time is up. I will just answer briefly one question there, which was what defines a genuine emergency. In relation to Council's declaring climate emergencies, I looked at the Civil Defence Act, and actually a climate emergency fits perfectly within the remit of the Civil Defence Act, because the Civil Defence Act is to cope with unprecedented and unexpected events that existing systems, i.e. business as usual, can't cope with. I think by any definition current systems can't cope. Is not making material improvement in our chances of responding adequately to climate issues. So, so I would argue there is a real emergency here. Tonight we've only been looking at a very particular part, and it was a very good focus to have on the way, on the materials we use, and to some extent how we use them, in our buildings. So, a very big thank you to the panel, to Jeff, to Helen, to Shawn, and to Sally. A big hand for them please. Thanks very much indeed. As we found last night, and I know we'll find again tomorrow in Christchurch, these are tremendously complex interlocking issues, and so the enormous challenge we have in a country, but it's around the world, is to find new ways to work on these and far faster. My great hope is the Zero

Carbon Act will get us going on that, because the Climate Commission will be setting five year carbon targets, which will be declining. Government will have to deliver, have to propose strategy, that the Climate Commission deems will make material differences and improvements towards those targets. So I think as a sort of an organising principle and organising structure, this is the experience of the UK over the last 11 years where there's significantly decoupled emissions from economic growth and brought about some amazing transformations, such as a two thirds reduction in the cost of electricity from offshore wind farms. I'm not trying to pin all my hopes on the Zero Carbon Act, but I think as a way of thinking about these issues, it will help us to advance on these very complex things in a much more effective way. Just very briefly in closing, you'll have seen from the emails that the Green Building Council has come up with this wonderful idea of not giving koha to panellists, but thank you hugely for your contributions, but rather making a contribution to, um, a charity. And you, the audience, choose. Now this is winner takes all as you will see in the email that you will get, the three charities are Sustainable Coastlines, Habitat for Humanity, and Auckland City Mission. So please, please do respond to the email that you'll get about that after the event. Please do vote. It is winner take all, so it is quite competitive. But it's all in a very, very good cause. So lastly, just my thank you to the Green Building Council for organising this terrific session, for our panellists, for you, for our hosts here in the town hall, thank you. And I just wish you all the well in, all the best in your work, and please, please do enjoy some more networking and refreshments at the back of this concert hall for a short while after this, half an hour or so. Thank you very much indeed. Thank you.