

File name: invest_ni___construction_event_-_melanie_dawson_introduction (240p).mp4

Moderator questions in Bold, Respondents in Regular text.

KEY: Unable to decipher = (inaudible + timecode), **Phonetic spelling** (ph) + timecode), **Missed word** = (mw + timecode), **Talking over each other** = (talking over each other + timecode).

Melanie Dawson: (Intro music 00.00-00.15). Okay, good morning everyone, and let's start by just welcoming you here to the Armasadi (ph 00.21) hotel. So, hopefully you've all managed to get through the traffic. I know we have a few people stuck in traffic on the way here. So, we'll have another few join us in the next few minutes, and they can take up some of the other seats, here. Today, we're here to talk about going digital, improving productivity, and the strive to net zero, and indeed, how we can piece all of this together. My name is Melanie Dawson. I am a BIM and digital construction consultant, and I have my own company, which is called Origin7. I founded that about three years ago, now, and about a year ago, then, in addition to that, I was privileged to join the board of Invest NI, as well. So, my role within the board is as a non-executive director. I will attend the board meetings, and again, share the voice, I suppose, of the construction industry, some of the challenges that we are facing, and again, I think I have a unique perspective. So, prior to starting my own company, I worked for about five years for Graham Group (ph 01.15), and again, I can see this all from the perspective of major contractor side. I've also worked with the Zino (ph 01.22) Organisations, and now, for the last, sort of, two to three years, I worked with lots of different companies, helping them to drive productivity, efficiency, and innovation within their organisation. So, you can hopefully see where there's a nice marry up between the day job and the work that I do as a board member with Invest NI as well.

So, today is all about going digital, it's about improving productivity, and indeed, the strive for net zero, and how we're all going to get there as a collective, as Northern Ireland PLC. I have split this up-, or, I suppose, my, my perception, whenever I was talking about today-, so, I've been working with the team at Invest NI whenever we were putting together this event, and I suppose there was three things that I thought that we needed to discuss or bring together in this room. So, the first one being the challenges that face us an industry, and today is not about, I suppose, discussing the challenges that we all know about, so the likes of rising material prices, Brexit, etc., things like that. It's about discussing the challenges that we can control within our own organisations, and those are the kind of things where productivity, innovation, and smarter ways of working can help us directly, and these are things that are within our control. Today is also about exploring some opportunities to resolve those challenges. So, again, we've invited along a number of organisations to share where they have found those opportunities already, and indeed, hopefully that will spark ideas for you, our organisation, or things that you think, perhaps, that you could start to look at. And the third piece to that puzzle, then, is we've identified the challenges, we've identified the opportunities, but who's here to help me? So, again, we have a strong team from Invest NI here today, and they're here to tell you all about the different support offerings that they can give you. So, not just presenting the challenges, how you might fix them, but also how can help you to solve those challenges, and really work that productivity and innovation into your organisations.

From my perspective, then, we have, sort of, four key challenges that we're facing as an industry that are within our control. The first one is in, the, the productivity space. So, I suppose, first of all, one of the things, and again, as a BIM consultant, information is king for me, but having the right information is what we all need to allow us to make those data-driven decisions, and having the right information in a structured way will allow us to implement stronger processes within our organisations, and that then leads to automation and digitisation. So, one of the first key ones there in productivity, is that. The second one is technology and automation. So, again, once we've ironed out those processes and we have streamlined those, to improve productivity, we need to find the right solutions that work with our organisation and what it is that we are trying to deliver, and that's not easy. There's so many solutions out there, and navigating to find the one that fits your organisations is a big task in itself, and again, we'll hear from some of the companies today on how they've managed to do that, some of the solutions that they have looked at, and indeed some of the positive outcomes that they have achieved as a result of that. The third part, then, is the people-focussed side in terms of productivity, and again, to become more productive, you will need to train your people, they will need to understand new skills, how to use new technology, and again, developing people is often overlooked when it comes to improving productivity.

On the productivity side, as well, there's lots of research has been done out there on product, productivity, and you will have seen the likes of the McKinsey reports and the Deloitte reports. And (ph 04.49) those, sort of, still surprises me that these figures don't change, but, I mean, the construction sector is one of the largest in the world's economy, with about \$10 trillion, and yes that's trillion with a 't', \$10 trillion spent on construction-related goods and services every year globally. So, you can see from an Invest NI perspective, if there's \$10 trillion worth of economic opportunities out there, why Invest NI would want to be involved, and indeed help companies within Northern Ireland to be exporting to the rest of the world. Even though the market is so big and our industry is so big, construction still remains in the twilight zone, very much, when it comes to improving productivity, innovation, and digitisation, and we are still the second least digitised industry, second to farming/hunting. So, that should give you a bit of perspective on where we are. Our typical spend in construction, as well, on IT services is just 1.68, 1.68% of our total turnover. So, again, a very small margin of money is spent on technology to enable productivity, compared to the scale of the market and the scale of the opportunities. So, again, definitely something that needs to be done there to improve productivity.

The second challenge that we're all facing, and I suppose, we're all hearing plenty about it, is sustainability, and indeed, we have things like the Climate Change Act, companies coming out with their net zero targets. The net zero target for 2050 is one that we will all hear, but there's many organisations coming out and saying that they want to be net zero by 2025, by 2030. So, a lot wanting to push that even, even closer, and again, that puts pressure on our industry to step up, and step up to those challenges. 40% of Carbon emissions are linked to the built environment, and again, that's why the pressure will be on us as an industry to do what we can to reduce the Carbon embodied in the products that we use, in the buildings that we have, and indeed, even in the existing assets that we have, to ensure that we're doing everything that we can to help reduce those Carbon emissions. The challenge really facing us, in terms of

all of that-, I mean, the UK has committed, through the Climate Change Act, to achieve that target of net zero Carbon by 2050, and that sounds like a long way away, but it really will come round quickly. I often would talk to people, again, from the BIM perspective, but we have mandates for BIM as well. We had five years to step up to the challenge, and again, that five years went in in no time, and then we got to the deadline, and still people weren't truly ready. So, again, it sounds like a long way away, but do be aware that other organisations have brought that date forward for themselves, but the 2050 date is the one that we're all very focussed on. And again, what we need is that dramatic reduction in Carbon emissions to help us to achieve that.

The third part, then, I have put on here, is just challenges around regulation. So, we'll have challenges around regulation in terms of sustainability that we've talked about, but there's also all of the other regulations that we have coming, coming our way shortly. So, the likes of the Building Safety Bill, so those of you who operate across the UK will probably be more aware of this one, and again the implications of that. Northern Ireland, typically, we're always about eighteen months behind whatever happens, in terms of legislation in the rest of the UK, but that one is coming, it is coming soon. It will have implications on part L (ph 08.15), and again, fire safety regulations that we have here, and again, we need to, to step up to those challenges. Many of the organisations here are already act-, exporting. So, you will be experiencing these requests from your clients across the UK and further afield. So, the bar is already raised, and it's how NI PLC step up to those challenges. We also have things like the 10X Economy framework here in Northern Ireland, which is really centred on the fact that we have a strong, positive relationship, really, within Northern Ireland, but the 10X Economy is also looking at the relationships between exports, innovation, and productivity. And again, what's worth noting is that firms that export are more productive, they are more innovative, and they're faster-growing, and they will tend to make the strongest economic contributions. And that would be through the likes of employing, employing more people, and providing better jobs, employing people with higher salaries and higher skill sets, encouraging further inward investor-, investment into Northern Ireland, because we have the skills, we have the talent here, and again, in turn (ph 09.20) we're able to export that further. And again, help with product-, productivity growth within our economy.

So, the third one under regulation, then, I have is social value. So, those of you who receive tenders and bids all the time will see this one popping up more and more, but again, the requirements within construction companies to meet social obligations to win contracts. And again, this will be driven by the need to implement new solutions, implement new technology, and again, increase the skills available within your organisation. So, a big challenge to step up to. The fourth one, then, that I have identified is just assistance. So, we have all of these challenges, of course there's opportunity there, but who can we reach out, and where is the help? So, there are organisations like Invest NI, and there are other organisations as well, where you can tap into funding and financial support, but the other big challenge, really, is finding people who can give you the knowledge that you don't have. So, whether that's, you know, bringing in specialist consultants, or reaching out to the likes of Invest NI or other supporting agencies to fill that knowledge gap for you. So, you may be trying to enter a new market, you may be trying to explore a new productivity solutions, but you don't know where to start, and again, having that knowledge or that experience from somebody who has done it before can be really valuable. So, that's

what we're here, really, to talk about today.

So, in terms of our agenda, today, and what we would like you to take away. There has been a slight reshuffle due to traffic, here, but up first today in our, sort of, digital innovation stage, we will have Lorraine, Head of Digital at McAvoy Group, and Lorraine's going to share with you some of her insights from the off-site modular construction perspective. And then we have Chris from Innovate UK, and again, he's going to share with you some of the challenges and opportunities that he sees within the market. We're then going to have a short break for about 20 or 30 minutes, and again, we would invite you to go out and take a look at our exhibitors, have a chat with the people who are in the room, grab a tea or coffee, and then come back in in about 20 or 30 minutes' time, and then we're going to focus in on product-, productivity and net zero. So, we have Mannok, here, talking about their innovative products, and then we also have Liam from Sustain IQ who will be explaining his sustainability platform, and indeed, the value of the data that we can all capture as construction companies to support those net zero goals. We will finish up, then, I'm going to invite the team from Invest NI up here at the end. I'm going to, essentially, ask them to give a short elevator pitch on what it is they can help you with, and then I'm going to table some questions to them, as if I were an audience member. So, these are the things-, the kinds of questions that I would hear when I'm out in companies as well. So, I will try and press them a little bit to get the answers that I think you will want, and then we will open it up to the floor, and then you can ask more questions. As each one of our speakers are doing their presentation, if you can start to think of questions as they're going through it, we have a roaming mic. So, at the end of the two presentations at the start, I'll ask you just to put your hand up, and then any questions, then, we will table it to the two speakers that you will have seen just before that.

So, the key take aways, or why we're all here. What we'd like you to take away today are the three things on the right-hand side, there. So, understand the challenges, and I'm sure a lot of you, you do. Understand the opportunities that can be explored, and again, how those can be applied to your business. Hopefully you'll go away with a spark of an idea, and look to see how you can put that together. And the third one is to be able to explore the support solutions that are on offer, and we think if you can take, take all of those three away, you should have had a successful day and some positive take aways and outcomes from the day. So, without further ado, I am going to pass you over to our first speaker today. Our first speaker is Lorraine McMorro from the McAvoy Group. So, I'm going to invite Lorraine up to do her talk, please.

Captions by www.takenote.co.

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Lorraine McMorrow: Thanks Melanie for the introduction and thanks to Gina and the team from Invest NI for inviting me today, to discuss McAvoy's and the recent delivery of one of our schools, Merstham Park School. So, my name is Lorraine McMorrow, I'm the head of digital within the McAvoy Group, and I've been working for them for the past five years. Previously I was an architect in design practice, so I have both experience on the design side and the construction and I'm very aware of the, kind of, challenges and positive solutions we can bring to the sector. McAvoy's are one of the UK's leading off-site construction specialists. We've been delivering quality projects for over 50 years. We constantly strive to innovate on our projects and apply a range of digital tools and digital processes to support our projects and our teams. Our predominant market is the education, healthcare and commercial sectors, with most of our work being delivered in mainland UK. McAvoy's head office is based here in Northern Ireland. In Lisburn we have a purpose built off-site factory that can deliver up to 1,500 modules per year, or about 45,000 square metres of space. We have regional offices in Dublin, London and Oxford and we're currently looking to, to open up new offices in new regions. We have a growing workforce of about 250 staff, 170 of them are based in our Lisburn office and we're constantly growing that as well. We're accredited to key ISO standards and this helps us drive our quality from the Lisburn office. There are two sides to our business, we have the modular rental and sales side of the business. Which delivers a number of, kind of, off the shelf standardised products for rapid delivery for our clients and then we have the permanent off-site division, which ranges from projects from £100,000 up to £35 million projects.

These projects are delivered using external design consultants based on a platform approach of standardised, repeatable components. That's some imagery from some of our recent projects, most of them are, are education, but I think it shows a really good selection of our projects and it maybe changes the perception of what off-site construction is. So, the project I want to discuss and share some insights today is Merstham Park School in Surrey, which we delivered for the Department of Education within 66 weeks and handed over successfully last year. The school is a purpose designed two and three story secondary school providing 900 pupils with high quality classrooms, play space, a dance studio and an all weather sports pitch. The biggest challenge for us was mid design, the client, the DFE, were keen to explore the application of their ten point pathfinder plan for reducing carbon. Due to the progressed design, existing stakeholder engagement, including the planning authorities, it was agreed to focus on operational carbon only. And we defined a four point project specific plan to deliver this. The project aimed to minimise energy usage by implementing the be lean, be clean, be green hierarchy. Which focuses on reducing the demand for energy at source through passive measures before considering efficient systems and renewable technology. There was a further workshop with key project stakeholders which led to this four point plan, and these are the items we identified for targeting and carbon reduction. So, an upgrade from the outlying specification, from the initial framework to the MMC school specific

brief framework. A waste water management system to ensure reduction in water by 25%.

Introduction of renewable energy sources to off-site, off set energy use where design allowed. And a biophilic approach to landscape to improve the health and wellbeing of the building use. Some of the strategies proposed to support this four point plan, so the upgrade in specification ensured the school was built to safer and more robust standards over and above the regulatory requirements. A review of the water management led to specification of dual flush toilets, low flow taps and showers, control valves, linked PIR systems, facilities to retain and store over 1,100 cube of water every year. Which allowed for an approximate saving of £2,750 per year. Some of the results realised from the application of this four point plan and the tangible measurable figures, up to a 50% improvement through fabric first approach, oh sorry, 44% of energy was achieved through on-site renewables, 73% reduction operational energy consumption, 650 square metres of PV panels were applied to the roof, which allowed for a saving of about £13,000 per year for the school. And a 97% reduction in gas, this would've been 100% reduction in gas on-site only for the science department required gas for the Bunsen burners. And that's some of the stats there. A biophilic approach to the landscape was also key to enhancing the student sensory connection with the natural environment. Improving health and wellbeing, overall increasing levels of relaxation, concentration and social engagement. The planting scheme absorbs about 16% of the annual CO2 emissions from this building, and it provides an enhanced environment for all. So, this project has demonstrated progress towards what we were looking at, the 2030 net zero operational carbon targets as defined in the LETI, London Energy Transformation Initiative design guide, which is what the DFE were using as a benchmark at the time.

We demonstrated a general improvement of new values in up to 86%. We had a space heating demand reduced to 14kw per metre per year and we maximised renewables with approximately 30% of roof area covered in PVs, which generated a 44% saving on energy for the school. And finally, just some imagery from the project. So, on the left hand side we have the virtual model and on the right hand side, we have the actual photographs. Digital technologies were used throughout the project to enable the, kind of, design optioneering and calculate the predicted carbon reductions and then that allowed the school and the DFE a more informed approach as to what was the best approach and strategies to adopt on the project. I've allowed for questions but I think we're going to take a break out session instead. So, I can answer any questions later on, thank you.

Melanie Dawson: Really interesting Lorraine, thank you so much, and I suppose some good examples there in terms of productivity through standardisation and we all know the benefits of off-site construction. I think what's really interesting about Merstham as well, is that not only have they maximised the standardisation part of it, but its also very bespoke. So, it doesn't look like its a series of modules, it's a-, it's a beautiful school. And again, it has won a number of awards and lots of accolade over the last year. So, again, really interested about the, the biophilic approach on that. Leanne, correct me if I'm wrong, but I think that your wall is hydrophilic, is that right, out there? So, we do have a green wall, out on show in the exhibition space. So again, during the break out do have a look at that, but similar to what Lorraine is suggesting, it's there to help with improve your (mw 08.18) credentials and

again, your, your green deliverables on any project. And I suppose one of the slogans that I think we can all take away and apply to our projects, be lean, be clean, be green and I think if we take that approach to all of our projects going forward, we'll be taking steps in the right direction. Next up on the stage then, we have Chris. Chris is from head of infrastructure at Innovate UK. Chris I think was like the rest of the room, got stuck in a bit of traffic there towards the end, so I'm glad to see that he's here and I'd like to welcome Chris up onto the stage please?

Chris Bagley: Thank you very much, good morning ladies and gents. Yes, it was a bit of a problem with traffic, compounded with traffic getting to an airport. The aircraft took off only half an hour late, so we're here, we're all in one piece. As you see, Chris Bagley, I'm head of clean energy and infrastructure at Innovate UK KTN, Knowledge Transfer Network in old money. We're all part of the Innovate UK system. One thing I will say and probably say a number of times as I go through this, we don't have money. Innovate UK is the innovation agency, they're the guys with the money, they put CR&D stuff together and they, they fund things. We as Innovate UK, UK KTN, we're the knowledge transfer and the innovation network. So, we're the ones that join people up and we like to join up the unusual suspects. So, the more unusual, the better. But it's bringing people together such that they can actually deliver projects using and working with folk they didn't know about really. So, that's about us. It's all about, as I say, joining folks up, such that they can deliver projects. People they've never thought about, getting that ah moment in a room. When you go, 'Oh, you do those, we could do with one of those.' And it's to get innovation out there for the benefit of UK PLC if you like. It's to get stuff going out there, doing real world stuff. So, that's what we do, we do that with a network of about 80,000 individual organisations, 280 individual innovators. We're linked with all of the universities, so we've got a good network of folk that we can deal with. What I'd like to do is have a quick trot through some slides, looking at some of the themes, the priorities, the ideas, the talking points in UK construction. Now, I'd love to be able to say I could also talk you through upcoming programmes, support mechanisms and such like.

We don't get much view of that. However, as we go through this, it's not unreasonable to consider that as these are talking points, there may be things that crop up in the future that could be funded around this. So, I do also apologise, I'm presenting these slides on behalf of a colleague that couldn't make it today, but then we'll go through. What we'll be looking at are a number of different points there. Against the context of-, and you all know this, construction, that's HS2 Euston site there. Someone that was in construction five years ago, 50 years ago, maybe 500 years ago, if you take out the big yellow things there, they'll see lots of mud, they'll see stuff all over the place, they'll see large, grey structures that are being put up. So, very traditional industry, but making inroads into new areas. And that doesn't come without its challenges. One of the first challenges is carbon, or low carbon. There's nothing new about low carbon materials, they've been around for ages. Wood, we've built things out of wood, mud, wool for insulation, but then we moved to new materials because the performance was perceived to be better, and in a lot of cases obviously were. But the move now back to low carbon materials raises a number of questions. Go back to the performance, is the new low carbon cementitious material that we're making, does it have the performance we need? So, there's a lot of questions going on around performance of low carbon materials, how will they work, how you can put them into, into, into deployment alongside traditional materials. Once they're in deployment, once you've built them into something, what's the longevity of it? So, it, it links into the performance side of things. You don't want to put something into a

big structure that's going to fall apart within a couple of years. Buildings don't do that, that's not what we want. And where do you get these things from, sourcing and the cost of it.

The sourcing is an interesting thing, as new materials come together, new materials are, are, are developed. What's the provenance of them, where do these things come from? So, they're all questions that need to be addressed. And then the codes, it's great, we want to understand how to cement works, we understand how steel beams work, but if you're using a new material, a composite structure for example, how does that work and how is it compliant with the new codes? There's a lot of work that needs to be done on new code standards. And the ways in which the new materials are deployed. And then is it actually low carbon material, isn't it? Where do you draw the boundary on what low carbon is? The ideal thing is to look through the whole life carbon, from sourcing, building in and through life of the structure. But again, how do you look at what that low carbon actually means. One of the things that we are doing at KTN is we have, most of the people have special interest groups, for some reason we have innovation networks, but we've got an innovation network that's looking at circularity of materials and circular economy. I'll be able to provide these slides afterwards with links to the various groups that I'll talk about as I go along, but that's something that you might find if you go to the circular economy innovation network, some work that's going on, building materials and materials in the broad that could fit into the low carbon agenda. Having the materials, what do you do about actually building the stuff? There's that drive to reduce the carbon in the opex if you like, in the building of what we're doing here. And looking at different site power and fuels. There's a number of options that you've got here, electric side of things.

Electric power, great, nice, quiet, low emissions, but an EV car driving around, you've got a reasonable base load in what you're doing, but the power density in batteries and then charging them up is somewhat problematic. So, you might have short delivery time on site. And then charging them on site, a remote site, may also be a problem. Bio based fuels, they're great, they're basically a drop in replacement to red diesel, red diesel is now no longer available, so what do we do to replace that? You can put bio based fuels in but can you get the bio based fuels and then do you get stuck in the food or fuel discussion? BEIS as was, did the red fuel, red fuel, red diesel replacements competition, that's gone through the process. I don't know what's come out of that. I know there's a lot of enthusiasm for another round of that, it hasn't been announced and we don't know what's going to happen, but you could understand why there might be interest in doing another round of red diesel replacement. If you've got bio based fuels, okay, they can drop in and you've got internal combustion engine, it's, it's a straight replacement. You could also go to hydrogen, there's a great hydrogen infrastructure developing. Here in Northern Ireland there's leading the way I think in, in a lot of hydrogen vehicles, the buses around Belfast, this stuff that could work. You could have hybrid systems. I think there's no clear winner at the moment, and that's the problem that we've got. So, we'll see lots of different solutions for different deployments, different people. Hybrid solutions, that means in the short term it's going to be a crowded and confusing market, but there are some routes forward and there are initiatives and support mechanisms developing to support each of those and hybrids there of. MMC, as we've just heard from the format, I'm not going to go through the ins and outs of, of what we could do here, but this is an excellent way of addressing skilled labour shortages on site.

If you're building or fabricating components in a factory, you get the repeatability, you get the quality. It's good, repeatable pieces of kit that can go out there, they're not being put together in an adverse environment. So, you've got a very good way of bringing together high quality, reliable components for your building. Helps with carbon reduction because you don't get the waste and you don't get the rework on site. And it's speed. The installation of a large structure, rather than building something up on site can make the whole installation a lot quicker, but it can cost more. There's logistics issues that are associated with this. But if the cost is wrapped into the whole life and you benefit from the performance and the quality, you've got to look at where that cost comes. And it's not a universal solution, there may be occasions when manufactured or MMC methods don't work. Combine MMC with, with big structures, with the fit out industry and you've got quite an interesting way of putting things together and going in. Digital revolution and AI, a massive change across industry, across the site as it says there. And potentially a massive change in construction. But construction doesn't move at the speed at which the digital industry does, and quite rightly so. You can't move at those-, you can't get a, a-, tweak a building because you got a little bit of it wrong as you go along. So, the speed of change needs to be moderated for what we can do in the construction side of things. As we've just heard, digital planning, drafting works very well. Moving that to a next level where you're incorporating AI for example, where you're looking at estimating of how long tasks with take. If you can then roll in ideas from other projects, what's the weather like, what are the local conditions are like, there's a lot that can be done within the digital and AI side of things. To improve the efficiency of the construction.

However, it's-, there's a lot of problems and there's a lot of issues around the control and trust of digital and AI side of things still. What is happening, how safe is it, how robust is it from being hacked, and the security side of things obviously comes into there. Once you have got digital in place, one way or another, a way of using it is site progress management, you could digitally look at what's going on site, take photographs, take scans of what's happening on site. See what's happening, build that into your digital model, compare it with what should be going on and make sure that what is happening is what should be happening, what was in the plan. That's out there now and people are using it as payment triggers for, for progress. A next level of this might be if you take that system, then use it for compliance, when it's going forward. So, instead of just using it as stage payments and saying you've completed this, take that to the next step, how was that task completed? Was it done to certain codes, it has been to those codes, if things change in the future, you can look back and say, 'Well, will that piece work actually meet the new way of doing things, I don't need to modify anything.' If anything goes wrong with the building, you can go directly back to that point in time and look at the visual evidence on what actually happened. Taking that a next step to connected digital sites, virtual reality meets design, deployment, build, the compliance and through the life side of things. A great idea but it does-, it does depend on hugely efficient and robust connectivity. I've got two phones on me, both 5G and both when I'm wandering around where I live, on the local train go into black spots, there's nothing you can do. So, it's great having 5G and it's much trumpeted, this is the way that you'll be connected wherever and whenever you want to do things.

The digital infrastructure to allow this to work safely and effectively on-site does need some further work. But when you get that through, there's no end to things that you can do on-site, that visualisation, bringing the digital planning into place. It will also bring new skills in. The connectivity we've addressed and the cost, how much does it cost to bring that infrastructure into place. There's a lot going on at the moment on building up digital infrastructure, we've got-, one of the innovation networks is Immerse UK. It's worth having a look at that, you can look in and see what's going on, and also there's a programme called Bridge AI, some of you may have heard of. It was launched yesterday, and that's looking at taking different sectors, construction is one of them and seeing what AI can do in those sectors. So, look at Bridge AI and Immerse UK, and you can find more some info there. If you've got that connectivity, then a great thing to look at is autonomous plant. England Highways Agency, they're leading on doing some autonomous connected, connected autonomous plants. There's some levelling plant that's going around, it's working extremely well. It's efficient, they've had a reduction in on-site incidents, keeping the people-, keep people away from machines, it works. And it's something that's working really well indeed. Not only was it working on-site and actually delivering on-site activity, but linking through to the logistics chain, it then updates people what's happening and the just in time logistics work very well with it. So, that autonomous plant has benefits and impact beyond the site on which it is working. And then it's great to do building lots of new stuff, but why not just transform what we have? For the housing side, most of the housing stock that's going to be around in 2050 is here already.

So, there's a lot that could be done with that. Improving the heating, improving insulation, improving the envelope, making it work as a better house. The technologies are out there and many of you guys in this room will have those technologies. The difficulty is almost all regulatory and social. People don't want to leave their home for an amount of time to have it upgraded, or they don't want to have people upgrading their homes whilst they're in there. If you can find a way of getting around that, then there's a massive, massive market to be won out of this. There's a lot of work that's going on within what was BEIS, DESNZ (mw 23.10) now, on looking at refurb, but when that will actually come out is, is another question. But do keep an eye on that. Taking that to the next step, on the commercial side, things that people are doing, look at refurb and reuse, commercial, industrial buildings. This is one in Birmingham today, BBC Midlands, it's the old Typhoo tea factory. It's totally been refitted, lots of digital work going in there. The refit starts this year and they should have people in there by 2026. So, that's that reuse, the best way to save is not doing anything new you could argue. So, there's a lot of things to do there, I've rattled through that very quickly and it's very high level, but those are the themes and the topics that we are hearing people are talking about. So, happy to try answer so many questions on that afterwards, thank you.

Melanie Dawson: Another really interesting presentation there from Chris. If I could just invite Lorraine to come back up and join Chris here as well. So, Chris touched on quite a few things I suppose that should resonate with us. And again, one of the key things being the low carbon materials and again, we have some exhibitors in next door who can show you more about those. Chris also mentioned just the innovation networks and indeed the circular economy. And again, that's what we need to be doing, is tapping into those other support groups as it were, and finding out what's going on in the wider picture. Chris also touched just on the MMC and fit out and again, I know we have quite a few fit out contractors in the room as well. So, again, those linkages between the off-site construction place and what we can do

to support smarter fit out going forward, is definitely an innovative idea to improve productivity that we should all be looking at as well. I thought it was interesting when Chris touched on the digital and the AI piece as well, and I know a couple of the organisations that I'm working with are heavily focused on that AI piece at the moment. And indeed with the pressures that we have at the moment on the rising cost of materials. Some of those companies are using AI now to try and help them predict where those prices are going to go next, and indeed stockpile where required, or place their orders earlier. So, they can have those materials at a lower price. So again, they're using the data and the analytics piece really to try and predict market trends and it's a really interesting way to look at that as well. On the autonomous plant one, I had a, a boot camp a few weeks ago and some of you would've been there. So, we did have an autonomous digger at that particular event. So again, good to know that we already have that type of technology here in Northern Ireland and it's available for people to tap into as well.

So, thank you for your presentation Chris and for touching on so many different things. So, I'd like to open it up to the audience please. So, if you have any questions for Lorraine or Chris, if you want to put your hand up, we have a microphone. We've two microphones in fact. If you'd like to put your hands up then we'll get the microphone down and you can ask your question.

Audience member: Hi guys, I suppose Chris, I'll come to you first, just I have a question around-, I suppose just it's all to the digital solutions and particularly the autonomous site as well. I was just wondering how joined up is the approach across the industry, are you seeing a lot of collaboration to actually make this work, or is it still quite fragmented and lots of different things are at lots of different stages?

Chris Bagley: It's-, from the construction side, it's, it, it remains a bit fragmented to be honest. But it's moving in the right direction. The, the Highways Agency in England, they do an awful lot of work to try and promote that through the autonomous plant side of things, because you can't have just the autonomous plant wandering around doing what it wants to without the control in there. So, that's helping things move along. DCMS have, was-, what was DCMS, have been trying to put through a lot more work on the 5G side of things, and reach out to industries that go, 'Well, we're not telecoms, why would we be interested?' They're trying to orientate things more to the end user side of things. And I think there's a lot of work that, that's going in the right direction for that. We've got a programme called I3P, the Infrastructure Industry Innovation Partnership. And there's work that's going on trying to join up the industry, so that they can get the best out of-, out of the digital platforms. But it's fracturing but moving in the right direction. So, it's, it could be-, could be a lot worse.

Audience member: This one is for Lorraine, it's Podric Maine (ph 27.49) from Outform Consulting (ph 27.50) here. We work with a number of, kind of, the, the client side infrastructure providers across, across the island. And I suppose from your perspective, going from contractor landscape and working with consultants, is there anything that I suppose those infrastructure-, I suppose the funders of those infrastructure in your clients could be doing differently to I suppose, promote the, kind of, the off-site construction and also these lower carbon alternatives at the moment?

Lorraine McMorrow: Yes, we find we're still having to go out to the market and educate people, both clients, suppliers and the end users of what is off-site construction. And hopefully some of the imagery you've seen today has really brought everybody's knowledge based on people still think as an off-site construction, these, kind of, sad, grey, portacabins. But really we're delivering fabulous projects, and so are some of our competitors. So, I think education is a big piece, I think procurement frameworks and strategies is also another large piece that we're trying to, kind of, support and develop as well with the clients, early doors because off-site construction, I suppose, it works best, when we do engage really early with the client, and sometimes we engage with the client and we say off-site isn't the right solution, or it's a mix. A lot of our schools the, kind of, sports halls, the atriums, the dance studios, they would be traditional construction and then we have our modular boxes around. So, we're not predominately focused on off-site if it's not the right solution. We will deliver that, but, yes, I think those are the two key issues we still see in the market.

Chris Bagley: I'd answer that as well that what we have seen, as well as the end client, a lot of the consultants that are helping those clients, and doing the design, I think they need an equal amount of education as well, because they do revert to the tried and tested and 'we know what we're doing here, so-, I think-, I'd echo that. There's, there's a lot of education needed across the board on what exactly MMC can provide.

Lorraine McMorrow: That's true. We find as well that clients are under a lot of pressure about capital expenditure where they're not looking at the whole life cycle. A client might just be purely focused on their spend, and they're under pressure and they have targets to meet. Whereas if they were looking at the whole operational life-cycle of the building, a, kind of, more holistic approach it might lead to a more off-site MMC approach.

Audience member: For both Lorraine and Chris, either/or-, what is driving decarbonisation within construction? Is the G, or the UK GHG protocol?

Chris Bagley: That, that's certainly one of the drivers for it, but I think across the industry we're seeing more and more people recognising that this is actually a good thing. If you can drive the carbon out of the structures, out of what it is that you do in the way you deliver construction, that's got to be a good thing. There's a, a recognition that this doesn't come without an initial cost, but if you've got a cleaner, leaner market and a cleaner, leaner way of doing things, it's perceived to be that that has got to be the way that will bring benefits for all sorts of different reasons, but, as you allude to, a lot of this won't happen. You know, the carrot's there, but you do need the stick and you do need the regulatory side of it too, to really push that through.

Lorraine McMorrow: Yes, I think that we would echo that. There's obviously a drive because we're feeling the pressure from the regulation and the clients pushing on that side, but I think, genuinely, we want to strive to do better, to deliver better projects, for the environment and for the community, and

we're also finding a bit of a turn. There's a real recruitment drive within McAvoy's at the minute, and we're actually finding candidates coming in, asking us and interrogating us as to what is our environmental and social credentials. So, we've definitely noticed a real change and if that's the kind of calibre of candidates coming in, you know, they're only going to drive that even further. So, I think it's a, kind of, two prong approach.

Audience member: Hi, there. Question-, well, probably for both of you, but Lorraine maybe, you could give us a little bit insight, particularly on why the, the, the, the choice was made to go for operational net zero, as opposed to a, kind of, holistic net zero approach with that big educational build that you were talking about?

Lorraine McMorrow: Yes, so, on this specific project, we were talking about Mersham Park School. It was nearly completely designed. We had already engaged with the planning, and the DfE, the client, were just very enthusiastic. They had defined this ten point plan, which was part of a separate framework. Mersham Park School had been appointed in 2019, so we were already quite far on in the design proposals and even statutory approvals. So, to go back on that school, really, would have felt the pain, and their programme would have been pushed out, and they were desperate for their facility which had already been delayed. So, I think it was just seen as a better approach to ensure that we all met our targets and delivery of the programme. If we could just design with the operational reduction.

Chris Bagley: I think you probably see, as well, on, on, on a lot of people that are specifying, you know, 'I, I need a new building to do X, Y and Z-, because that's the building they need, they can get their heads around the operational side of it, rather than everything that leads in. So, again, there's that extra piece of education to if you can also take into account the front end loading, of, of, of decarbonising, there's, there's additional benefit there, but-, as the end user you see the op ex bit, I guess.

Audience member: Hi, David Clarke, (inaudible 33.52). Fantastic to see the project that can be delivered through MMC. Just following on from the last question, then, everything was, sort of, focused more on the operational side, so, post completion, operational stage at the minute, have you any real-life data to give you metrics against the design targets versus the actual in-use? And are there any digital solutions being used for that?

Lorraine McMorrow: Yes. So, yes, we're still working on that. We only handed the project over-, I think it was late last year. So, we're still in that twelve month phase, but the data and analytics that are coming back are better than we expected, and it's the only digital tools, kind of, that's being used is a digital BMS system, but the client is looking to actually further that, so that they can gain better insights and, kind of, employ a, kind of, proactive maintenance regime for the project, because they're seeing the benefits already. So, there's still some teething problems that we're resolving, but generally the analytics coming back is better than we expected, so it's good.

Audience member: Hi. John McKenna. We supply app based gate control access solutions, so we're right in the middle of this digitalisation and, and, and drive for ESG. Just a question for both of you, (inaudible 35.12) within companies, who do you find that is responsible for and had this discussion this morning already, is responsible for ESG and digitalisation? Is it one person that tends to head it up, or is it joint responsibility and, therefore, hard to pinpoint who's really responsible?

Melanie Dawson: I, I think, if, if you ask a lot of people think think it's the IT within an organisation and that is not the right answer. I'm seeing lots of IT people now and they're actually putting, sort of, on their LinkedIn profile 'I am not the person to ask about'-, so they're actually putting in brackets about it-, so it's not that person. Again, if you can tap into the likes of the, you know, the head of digital of somebody like that within the organisations from the construction side, those are the people that you need to be speaking to, because you're talking the same language and they understand what your product is already. From my perspective as well, and, again, I know we have some plant organisations here, in the audience as well, but those involved with procurement on behalf of plant organisations. So, those involved with the procurement of the project. Again, when I'm seeing in a lot of the tenders that are coming in are requirements, are ESG requirements being written into the bids. So, again, they're being written in the early days, in advance of the net zero carbon targets, but clients want to be ahead. So, I would say, from a client perspective, it's those involved in procurement and the putting out of the tenders, and I'd say from the contractor's side, the best people to speak to are the likes of the digital people. Stay away from IT, because you'll not get a warm reception, but if you can find the digital people in the organisation they'll know what your'e talking about and they should appreciate why your solution is an added value solution and that it's not just a gate solution. That it actually-, it will help them meet other targets that will have been passed on to them through contracts, as well. But, interested to hear what Lorraine and Chris have to say.

Lorraine McMorrow: Yes, I suppose within our organisation, our our ESG is managed-, it is managed by one person, but under that person that we have a committee, including myself, but it's, kind of, one or two people from every department, because it does affect the departments. Then, I'm implementing software and sensors in data analytics to try and pull that data where we can, and then that should help us to predict future trends, make informed decisions, etc. So, we're still quite early doors on that journey. We have our ESG strategy in place probably about a year, 18 months. It's the data collecting, now, that we're working on.

Chris Bagley: Yes, and we're, we're, we're finding quite a few companies are taking a similar approach or have somebody drawing a team around them of the various interested parties. The difficulty is finding the, the title. You, you, you go to head of digital and they're trying to, 'Well, I do SAP. We do all our internal processes.' I can't tell you the amount the times, as head of infrastructure, I get people saying, 'I can give you a cloud server.' I'm not interested in them. Bridges, and power stations, that's what I'm interested in. So, nailing down the right person is, is, is difficult. It, it has to be said. Head of ESG, and we've seen quite a bit on the, the development type folks are the ones that are looking at the R&D side of things, because it's seen as something new to adopt.

Audience member: Hi, guys. It's Mark Mitchell from Top Glass. My question is probably a bit similar to the, the previous one. It's more of a general question, Lorraine, where we're, we're just starting out on a digital transformation strategy, and, and I'm just interested to hear a little bit about how long McAvoy's have been on the journey when-, I, I was excited to hear your title, Head of Digital, and that you're from an architectural background. You know, because there is this misnomer it's, it's all IT. But, I wonder, could you take a couple of minutes and just tell us about how long McAvoy have been on the journey? Maybe when you became Head of Digital? Who works in your team? How big is the team? And, and how you-, how you kicked the whole thing off.

Lorraine McMorrow: It's a never-ending journey. So, we started years ago. David Clarke started our digital journey in the McAvoy group and-, it was driven by BIM, but I think we were, kind of, doing BIM before we realised what BIM was, because we'd seen the efficiencies he used in 3D models, co-ordinating, federating them, intelligent data within the models to speak to other departments within the business. So, like we spoke about earlier, the regulation really drove our digital journey, and then once we were onboard with the quite early doors, we'd seen the benefits for ourselves, and probably, quite selfishly, just drove that on. So, I joined the business in 2018 as a BIM co-ordinator, moved on to BIM manager, and it's only last year I became a head of digital because the company really sees a focus on digital and it's more than just BIM and information management. It's the whole technology software and the connection between all of them. So, I've a very small team, but I suppose my role is really to support the other functions within the business. Other companies either apply or drive their digital that they have a core digital or BIM team and they're the people that do the black magic in a dark room. Whereas, I suppose, our approach has been to train and educate and develop our core people to do it. We don't want BIM to be seen as just a BIM manager's role. We want our project manager, our procurement manager, our design managers, all to be responsible. We all create information on a project, so we're all responsible for that information, and I think that approach has really driven us, that everyone's responsible, and it makes it easier for us to take the next steps. So, now, we're implementing another piece of software to capture all the data and the analysis. So, we already have an upskilled team. So, making those, kind of, small steps has been a lot easier for us. But, it is. It's constantly changing, never ending, and you're always looking to the market to see what's the new technology. We just implemented AR technology in the factory last year for design verification. But, I mean, as soon as we have that implemented, there's something else out there that you can see benefits, and I suppose it's just trying to weigh up what really is going to bring value to our process. Then, there's also the frustration that Chris, kind of, alluded to about this connectivity between different processes and technologies. That is a real frustration for us and we've tried to drive a process of open BIM and inter-operability to ensure that we can connect different software, different platform, that we're not reducing our supply chain, who are maybe using a specific piece of software if we're using open file formats, like, IFC, BCF. It doesn't restrict our supply chain, both up and down. So, yes, there's a lot of good stuff and a lot more to do as well.

Audience member: Thank you. Eugene Heaney (ph 42.06), Business (mw 42.07) Development Manager, invest in I (ph 42.08). Thank you all for your presentations this morning. I would just like to ask-, probably McAvoy's, just with regards to the carbon benefits of using modular manufacturing, your methods of construction against the traditional methods, is that something you're measuring at the moment? If so, how do you educate your customers of the benefits therein?

Lorraine McMorrow: Yes, so, we're actually involved in an Innovate UK project a few years ago, Seismic, and that was exactly what that project was to do, was to develop this standardised platform approach and we actually worked with some of our competitors over in England, (mw 42.46) who are another off-site construction company in tactile steel, and part of that project really was to define what was the saving to the end user. So, in terms of sustainability, carbon, programme, and then there's also the health and safety benefits as well. So, we were able to measure on that product, specifically that there was a 33% saving in energy from delivering those projects. So, it is something that we're currently tracking, and we're always looking to strive and improve upon that.

Audience member: Sorry, I near missed the boat there. One for you, Melanie, and one for Chris, I think. Yours, Melanie-, I noticed when you-, during your presentation you had social value under regulation.

Melanie Dawson: Yes.

Audience member: Now, I know that in England and Wales, there's certainly a heavy obligation for companies when they're tendering to have a strong social value component to their bids as a result of this social value act. We're not under that same legislation here, so what is the regulatory control?

Melanie Dawson: Well, I suppose we're not under it yet is the caveat. So, I think a bit like-, I think I had build in safety bill on there as well, and again we're not under that one yet, but the reason that it was on there is because the majority of people in this room are already exporting to the UK, so those regulations will apply if you're delivering projects in England, Scotland and further afield. So, I suppose that's why I had it on there, but, again, I think it's, it's where companies here manage to punch above their weight. So, we're not waiting on the people in Stormont or those who are driving our regulations here to decide that, yes, it applies here. We're actually just going ahead and doing it anyway. Again, the organisations who seem to embrace that first seem to be the ones that get the advantages from it, and, again, productivity and innovation gains as a result. So, it was more a forward looking thing, and in the respect that the majority of companies here are already stepping up to the challenges of the regulations that we have in the UK, or, indeed, further afield. So, it was around that.

Audience member: Sorry, I thought I'd missed something, there. It's a good job we're not waiting on the guys out in Stormont (talking over each other 44.58)

Melanie Dawson: Definitely not, we'd have a long wait. Yes.

Audience member: Chris, this one's for you and, really it's, I suppose, it's a-, it's a comment more than a question. Don't demolish. How well is that message being, well-, is it being well delivered?

Chris Bagley: No. It's not being well delivered. I think is probably the, the, the, the honest answer to that. Where it is being delivered it's-, and the education and the, the benefits that can come from that are being properly articulated, it's well received, but I think there does need to be a broader engagement with stakeholders. Horrible buzzword bingo there, but there does need to be more information put out on, on what can be done. So, it's patchy. As I say, where it is properly put forward it has been well received. I think it will gain ground, because people will start going, 'That looks like an interesting project, what did you do there? I'd like some of that.' So, it's, it's gaining that momentum.

Audience member: Thank you so much.

Audience member: Morning. Again, an observation, I suppose, more than a question. I work for the health service executive in the south of Ireland, formerly of these shores, as the accent probably gives away. So, going back to the points that were made earlier about how do you turn the tank with this, and it feels like it is turning the tank-, it's a bit like the car industry twenty years ago, moving forwards to electrification and so. And, certainly, you know, the organisation I work is a very large health organisation in the south. Capital budget of about €1 billion a year, about 4,500 buildings-, so this is a live agenda for us. And, we're trying to move on the journey that, that, that's been described today, but both in terms of the retrofit of existing buildings, but moving over time to the, the the MMC approach for new construction as well. What we've found in that is, actually, there's a lack of capacity within the sector to be able to respond to that. We-, in terms of that scale with, with a-, with a-, a, you know-, certainly off-site, but that scale off-site, and I think just to put that out there-, but what we've also found is the ability of the various stages whether it's ourselves as a client, whether it's the design architect, (mw 47.25) things, where there's planning in local authorities, whether it's the sector itself-, whether it's actually the people who will use the facilities in due course. There's a lot of stakeholders with some views to be turned around all of this. (inaudible 47.37) in the north, we'd certainly have a key opportunity with public sector clients, anyway, helping to ensure there's leadership in this space from there, because I imagine if I was a, a modular company like McAvoy's or anybody else trying to do that from the outside in, it's probably exceptionally difficult with the public sector, and, and the point that was made around who to go to-, you know, definitely it would be the head of whoever's leading the capital function within an organisation is where I would start, and I wouldn't go anywhere near IT. But, but I think it's a journey that we're all on here. The quickest way we'll get there is certainly in the public sector, is if, if the client side and health, education and so on are clearly leading in this space, and then I think we might find everything becomes a little but more straight-forward.

Melanie Dawson: Thanks for your observation and, and, I mean, I couldn't agree with you more. I, I, I personally work with lot of public sector organisations and, again, I would help them with implementation of their digital strategies or their BIM strategies, for example, and also with private sector clients, as well. And, I mean, my key bit of advice to, you know, either public or private sector clients is to have a plan in place. Normally what I will do is I will offer them, you know, twelve things that we can do this year, and of that list of twelve things they may pick three things, but once they start to take a few small steps, what you'll find is quickly that they will grow, grow momentum, but, again, I think having that plan in place-, and, I mean, Lorraine, sort of, touched on it a little bit as well. It's a never ending plan.

At the same time you will always be adding new things to the end of it, and the things that you thought you had done you almost need to go back and revisit again, but having the plan in place is, is the key thing, and being able to follow that through is just so valuable. Richard?

Audience member: I've a multi-pronged question here, for all three of you. Life cycle analysis. How important is that in the design and decision making process at the front end at the minute? And, if, if it is, or if it isn't, what are the barriers? So, that would be the first question for Melanie and Lorraine. But, then, onto Chris, if there-, if there's a lack of adoption, but there are-, there is benefit to be gained from it, who could we look to as far as leadership? Looking at examples, who's the-, who's the good examples across the UK in using and implementing life-cycle analysis in that design process?

Melanie Dawson: Good, good question. I mean, I think, for me the, the biggest barrier that I would face on projects is the fact that the LPEX and the CAPEX (ph 50.14) budget are two completely separate things and two completely separate people are looking after the capital expenditure and then the cost to maintain that building going forwards. So, there isn't, I suppose, sight of the full life-cycle. People are looking after their respective parts of that. The organisations that I see adopting life-cycle analysis most successfully are the types of organisations that own portfolios of assets and they will continue to own that portfolio for a number of years to come. So, I suppose, probably from my perspective, you know, one of the clients that I would work with would be Danske Bank, and here in Northern Ireland they have around, I think, 28 different branches in Northern Ireland and they're going through that life-cycle analysis piece at the moment, so they're evaluating their existing estate, and then they're looking for ways to improve the operation of that estate then going forward. Then also, how they dove-tail in new branches or refurbishments and things like that, as well. But, they're trying to take that whole life, helicopter view to see how they could spend their budget better, right from CAPEX right through to OPEX. Again, it's having that foresight and being able to manage that. So, I would say, generally speaking the clients who retain their portfolio of assets-, so, again, it applies to-, universities are a great example as well, where they would normally hold the large portfolio of assets and always are building something new, as well. Having that, I suppose, end to end or somebody responsible for both parts of the budget is normally a key determining factor. I'm not sure what Lorraine and Chris think on that one.

Lorraine McMorrow: We need to discuss and review that very early on in the project, but from our experience only, the clients aren't coming to us with those requirements. It's very much-, it feels like they're very siloed in their approach and they have a job to get done. They have a budget they have to meet, and I think that's a real pity for projects, because they're not getting their true value out of the projects. So, yes, I think there's a bit of work to do there on some of the clients we deal with, anyway. I expect private developers probably are better at this. But, yes, just a bit more to be done.

Chris Bagley: And, and, again, you know, I'd echo those that have-, that have got the assets that they're going to keep-, who to look to-, we're seeing a couple of the health trusts are taking a bit interest in this Hull Health Trust, for example. They're, they're quite interested in, in how through life-cycle analysis could help. Ministry of Defence, strangely enough, they've got lots of assets. They're looking at things that are going on. Equans (ph 52.43), used to be (mw 52.44) Energy. They are really quite interested,

because they've got a diverse portfolio of, of, of assets out there of, of very strange bits and pieces that they're looking after. So, those fleet owners, if you like, where you can get some interesting modelling done, the energy systems catapult up in Birmingham. They've got a bunch of kit and buildings that they use as their living lab. They've got some outstanding modellers on life-cycle analysis. So, from an academic point of view, if you like, or a modelling point of view, there's a really good resource there to look to.

Melanie Dawson: In the middle there-, just-, Yes.

Audience member: Thank you. This is for Chris, really. A follow up on the, the concept of don't demolish. Are there any studies there we can refer to that would be definitive in that? Or is there are scale by which a building is so far dilapidated that demolishing is best? Not just for the financial end, where you wouldn't be throwing good money after bad, but you would also-, a bit like the life-cycle of a building, that you wouldn't be throwing good carbon after bad, to take on an old building, trying to make a silk purse out of a sow's ear. We've just heard how you, off-site, delivers with about a third less carbon, third less waste. Is there any studies that would look at where the analysis is of if there is obviously a point where you demolish and rebuild, be it by modern methods of construction? Any studies you can refer to that are either definitive or show the point at which is becomes logical to not demolish or do demolish?

Chris Bagley: The unhelpful but very short answer is I don't know. There certainly should be, and I, I, I put my hands up, honestly, I don't know where those studies are. I'd be astonished if people like Connected Places Catapult, for example, haven't got some work that they've done on that. Nottingham University have done quite a bit in the background that I wouldn't be able to refer to any particular study. It must be out there. But, good call. I shall-, I shall find out.

Audience member: Thanks. Just picking up on this point, one project that I'm aware of where this has been a big issues recently is in London, which the flagship Marks and Spencer store in Oxford Street, which they want to redevelop. They wanted to knock it down completely and there's been a big hoo-hah and planning has been delayed over it, because everyone is up in arms that the building should be reconstructed, reused. One of the excuses they gave was the fact the building was full of asbestos, which I found was hysterical, because either way they've got to take the asbestos out before they knocked it down or refurbished it, so it couldn't be used as an excuse as to why the building had to be knocked down, but it's been a big issue. So, it is coming to the forefront now, definitely, that planners, certainly in England-, there is a requirement-, and now to demonstrate the environmental credentials of what you're doing, and particularly on major projects. So, it is becoming a real issue now, the discussion between knocking down and reconstructing.

Chris Bagley: And that absence of some definitive reference work I guess, is what makes those discussions go on and become acrimonious in some cases.

Audience member: Yes, well-, anything involving numbers comes down to the old adage about statistics, doesn't it? You know, lies, damn lies and, you know, all the rest of it. So, you can work the figures, I guess, on any project to suit the argument that you want to make. You know, but the reality is, as was demonstrated with the BBC project, there is the potential to do some fabulous work reconstructing buildings, and we've always done that. It just has to be more of a focus. But, in reality, sometimes, it's not the most efficient thing to do, but I think it's definitely high on the agenda for people, now. It has to be, and if you're a big employer, you know, with those, big, publicly visible projects, you are very answerable for it these days, before you go swinging, you know, a sledgehammer into a building.

Melanie Dawson: Okay, so, I'd like to let you know there's tea and coffee next door, and our exhibitors are next door. If we can all come back here for 11:20, then we'll kick off the next session, but if you could all put your hands together please for Lorraine and Chris and I'd like to say a big thank you.

Captions by www.takenote.co.

File name: invest_ni___construction_event_-_productivity_&_net_zero (240p).mp4

Moderator questions in Bold, Respondents in Regular text.

KEY: Unable to decipher = (inaudible + timecode), **Phonetic spelling** (ph) + timecode), **Missed word** = (mw + timecode), **Talking over each other** = (talking over each other + timecode).

Melanie Dawson: The next two speakers are going to be zooming in on productivity, and also net zero. So, first up we have Kevin Lunney. Kevin is the Operations Director at Mannok, and Mannok, who have recently celebrated a giant step forward in decarbonising cement production. So, I'm going to invite Kevin up to share his presentation and there's a really good video in there as well. So, welcome.

Kevin Lunney: Thanks very much, Melanie, and thank you all for coming along. I just want to go through, I guess, a few points just firstly by way of background of who we are. So, Mannok is a business based down in the border between Fermanagh and Cavan. We employ 818 staff, and principally we are a manufacturer of heavyside product for the construction sector, and a lot of our products would go into, obviously, traditional construction, and also into the off-site build products. So, we make insulation, for example, we make cement, which is our biggest product. We make blocks, we make aircrete blocks for the, for the building sector. We, we make standard blocks, and we make a whole range of aggregate materials for the constructions trade. I suppose one of the interesting parts about us is we have the border running right through our operations. So, when Brexit came along, it was obviously quite an interesting challenge for a period of time, and particularly when you take the context of the situation, where we send about 90 articulated loads of material to the UK from this complex every day, and that complex of material is made up of light goods and heavy goods, some of which are manufactured in Northern Ireland, and some of which are manufactured in Southern Ireland. So, when we got into the whole concept of producing customs documentation for products that were going out through, perhaps, out through Rosslare over to the UK, or going out through the Belfast ports to the UK, and the relevant documentation to integrate with Irish revenue, HMRC, both imports and exports, it was, you know, a particular challenge. I'll come back to that a little bit further, but it just gives you a little bit of a context of what we're trying to deal with, and I suppose it leads, you know, quite neatly into the whole digitisation process, because we wouldn't do this. We wouldn't be capable of doing this unless we had a fairly substantial digitisation programme.

I suppose what we've done, and I think I just have a couple of slides of introduction, my main focus is on decarbonisation, but I suppose, we've, I suppose, embraced this probably about five years ago, the whole context of productivity and digital, and from my point of view, very much these are all interrelated. They're very much part of the same process, and one dovetails with the other. So, we've implemented Lean and Six-Sigma in quite a number of our plants, and we're continuing to roll that out, focused heavily on the operations of the business in the manufacturing of the products that we've got. But, dovetailing with that under our what we call our Leading Excellence programme is the whole skills and development

programme, which provides targeted training and, again all of this leads us-, there's a digitisation element to all of this. Sustainability is one of the core four pillars of what we do, and continuous improvement feeds into that as well. So, I think it's important to note that these things are not to be seen in isolation. Sustainability, digitisation, training, development, they're all part of the one programme, and we've tried to develop that under the Leading Excellence framework. So, just some examples of some of the things we've done, I suppose it's just getting into the whole process of five S, Six-Sigma, all those various stages. So, we've started, you know, a significant programme of change, and I suppose a few questions was asked earlier on, who does all this sit within the organisation? We developed a role in our organisation called Business Change, and there's a Head of Business Change, and the Business Change role is not, definitely not an IT person. I think that's a significant important note. They're involved in looking at process change, analysing what we're doing, and try to build efficiencies into the process.

So, we have implemented quite a lot of digitisation, quite a lot of improvement programmes across the board, and I suppose just to give you some of the examples of what we've done, and I'm not going to labour this point, because that has been covered in other areas, but we have transformation programmes in place for production and optimisation, and we have started to include some expert systems and I guess, I call them semi AI, in terms of the processes that we adopt. In the whole maintenance routes we have some very significant costs associated with maintenance and we've developed those. Transport and customs, I mentioned earlier on, particularly around the whole export, import side for materials coming in, but more importantly for exporting material to the UK. Environmental health and safety management is something that we've digitised, and I know it was mentioned earlier on some comments about access to sites and all that, sort of, stuff, but what we've, you know, sought to do is to integrate that with that, with things like insurance covers, our insurance is in date for sub, for subcontractors coming in the gate. What is the certification for the individuals involved, have they got the right certification for coming onto site, coming onto our sites, or any other sites that we're involved with? Skills and training, we developed a, a very significant piece of work around digitisation, really this is converting what was paper based, written training and standard operating procedures into a digitised format. So, we now have a programme whereby every operation that we do in the plant, in any of our plants, it has been certified by Health and Safety, but it's a video and we show the video, and we train the video, and there's a test on the video for any individual who's coming into the company, and that has been probably one of the most transformative things we have achieved, because we have identified in that, that all these binders of standard operating procedures that everybody writes and gets in place for ISO 9000, or whatever they happen to be, nobody reads them.

So, what we have to do is try to bring that out onto the factory floor, so we have training stations right throughout the plant, whereby they will actually, all the workers have the opportunity to pull up the video, they're tagged, they're indexed, and they can watch the video about any particular procedure, and you can be sure they can do that in the context that they are doing it the correct, safe way, which has been certified by Health and Safety, and that's a significant thing. Energy management, and this starts to lead us on into the whole context of sustainability, energy management is, is, is huge. We are spending probably about 40 to 45 million pounds per annum on energy between energy and coal, between electricity and coal, sorry. So, having that controlled and making whatever possible savings in that, and having that as

efficient as possible is, is major. I'm just going to touch on briefly the context of LCAs and EPDs, life cycle analysis for the production of our products, and sending our products to architects, or to construction companies across the the whole of Ireland and the UK with the relevant EPDs is critical to our function. So, we have digitised the product from that perspective, we have, insofar as we can control the carbon content in those, it goes, it goes with them, and that's, and that's a key thing. So, obviously happy to talk a little bit more about that because that's not necessarily the main focus of what I'm about. I want you to learn off this slide by heart, and I'm going to question you at the end. This is just an example of what we needed to do for transport and customs when we started to do this. So, really is just an identification to say we needed to analyse this very, very-, in a very, very detailed way between our ERP systems, our customers, our haulage organisations, how was the whole process going to work?

And while it was challenging and difficult, I'm glad to say at this stage, that everything that we sent to the UK is now totally-, sorry, totally automated, we don't have any paper in that process. So, that is, you know, a prime example of how somebody had to deal with a very difficult and new problem, and present it. So, we've gained efficiencies in that, there's still, obviously, some, some overhead in running that process, but it has allowed us to export those 90 loads, of mixed loads of product every day, and the mixed load context is extremely important for us from a sustainability point of view, because if we're sending a truck to London from Fermanagh, we don't want to send it half full with a load of cement on the bottom. We want to send it with a load of cement, plus a load of insulation on the top, so that's it's a full load, an efficient load, a sustainable load. Customers on the other end really like that because they get one load instead of two, and that's how-, that's really one of our unique selling points. How we can compete selling product into the UK on that basis? So, really that's just a context to do, to do that when the Brexit thing came along we were worried about it, because it was potentially going to upset our USP, but thankfully we've got sorted and we're fully integrated with all the relevant customs authorities of whatever stage you are. I just want to talk a little bit now about sustainability, and I suppose as cement manufacturer probably one of the highest polluters in Northern Ireland. We were very conscious of this from an early stage, and I suppose in many senses I suppose, thinking about the philosophical questions around this, I suppose we had to evolve our thinking. I suppose we were sitting as, you know, a major focus point for an organisation producing a lot of carbon into the system.

So, I suppose in many stages when we started the process we were, kind of, taking the low road, kind of, let, look at, maybe let's not say too much about this, we're a big polluter, let's, let's wait and see what everybody else does. Let's figure out if somebody else maybe can come up with the solutions before we can. But, the more we started to think about this, we realised that probably doesn't work. We needed to start to think about this in a slightly different manner, and we started to look at this and said, 'Let's tackle this problem head on.' We are a producer of somewhere around 800,000 tonnes of carbon per annum, in Northern Ireland, or in Northern Ireland, sorry in Ireland because its manufacturers based just south of the border, but we've a plant in the North as well. So, majority of it is, is produced in that region, and what are we actually going to do with that? Everybody else is maybe going on to different opportunities around carbon capture, and carbon storage, and all these things, but we don't have some of those opportunities. So, we needed to really tackle this problem head on, and we have been doing that for the last four or five years, and I'm glad to say at this stage, we think we're making some progress. We're certainly not there,

but we think we have a pathway to progress, and I think where we're at at the minute is trying to think ahead, and some of the things that we've done more recently is actually trying to create an opportunity out of some of the issues that we've got. We're a large producer of carbon in an isolated area we're 100 miles from any port, and 60% of our business goes to the UK. How do you solve that problem?

So, I suppose those were the types of things we're trying to, to figure out, and about two years ago, we set about really looking at this and we got our board together, and we got working groups together, and we started to produce what we called our 2030 sustainability vision, and we didn't have-, you know, we got our board to, to recognise first of all, and our financiers to recognise, this is something that you're going to have to sort. If you don't do this within the next five to seven years, you're not going to have a business, and we know that. So, I suppose where we ended up with that is we ended up with a sustainability vision where this is, sort of, the key point, and I think it's no harm to mention it because it's, it's something that everybody has to make this transformation, in our belief. So, we've set about the main driving force of that is, where we've said is, we've a moral and ethical obligation to do everything in our power, and sphere of influence to offset the worst effects of the three global crises that we're all facing. Climate change, biodiversity loss, and pollution of the environment. Now if you were to look at that and say, 'Well, Mannok is probably the organisation that's the most at-, the most influencing those in its region.' So, how do we fix that, because we still have 800 people that we have to employ, and we can't just, sort of, close the book on it and say, 'It's not going to work.' So, what we did was, we developed a whole range of things in that sustainability vision around people, planet, and partners, and it allows us to focus on all, sorts of, things around development of our personnel, training, development, health and safety, which we mentioned, and also our position in the community, and the position with our customers. So, that lead on to things like developing the EPDs, so that we could give those to customers and construction companies.

It allows us to get involved with local schools, whereby we would set up-, we set up a Mannok futures programme, and in that Mannok futures programme we have partnerships with local schools, and it's one of the most transformative things we've done. So, we've now a formal partnership in place with six local schools, one in Cavan and five in, in, in Fermanagh, secondary schools, whereby we actually go into the school and talk to them about real problems. Real issues around sustainability, real engineering issues, real things that are important, and the feedback that we have got from that, from the schools, it's hugely educational for us, because they begin-, the school kids who are really looking at everything from digitisation through to the current thinking in relation to social values. They're telling us what this needs to be, and we have-, and I suppose, we're taking that on board and trying to develop it into a programme for the future. So, we've schools programmes, we've apprenticeship programmes, we've graduate programmes, we've experienced ongoing life, life long training programmes, and the more you put into that while initially, you know, we said, 'Well, this is a bit of an overhead, can we spend all this money, this time on this?' Very, very quickly realised that the value we're getting back is a multiple of anything you're putting into it. So, I just encourage people to think about that. Specifically with Mount Lourdes school in Enniskillen, we developed a partnership in sustainability, and again, the value associated with that is, is immense. We put a camera, a live camera into one of the quarries in, that we, that we use for the cement plant, and inside the quarry, inside that-, in the quarry there was a nesting site for kestrels.

So, we'd noticed that these kestrels were, were coming every year, so we put a camera in, and we then we put a live feed into the school, and the amount of, of positivity that we received from the girls in the school watching the cameras, watching the eggs hatching, seeing the kestrels develop and, and, and-, then fly away, and then when are they coming back, and the education associated with that. That allowed us then to promote the concept with Ulster Wildlife where we did a natural assets action plan, where Ulster Wildlife actually studied all of our 2,000 acres that we control, and they said, 'To improve biodiversity, in the best way possible, what you should do is do this, plant trees of this nature there. Try to do something with that invasive species,' and now we have a programme of works, where all the workers are starting to get involved in protection of biodiversity on the lands that we control. So, a significantly positive feeling around all that is what is, what is driving some of our activity, but the real issue, I suppose, where the rubber meets the road is around carbon reduction, and we are a cement producer, so how do we actually get the carbon out of cement? I suppose a couple of things maybe to note, this is a calculation of the submissions that we make to the EU ETS scheme. You'll see on, for '22, which is the year just ended, 64% of the carbon that comes from the manufacture of cement, which, this is really the manufacture of clinker. Clinker is the first stage in cement manufacture, there's two stages, you manufacture clinker, and then you blend it with various materials to make cement, but-, so the core measure is the carbon intensity of cement-, sorry, of clinker, and 64% of that doesn't come from any fuel. It comes from the, it's effectively the melting of limestone, or the burning of limestone and then calcination.

So, even if you have a totally renewable fuelled cement plant, you're still going to get 64% of the, of the, of the carbon that comes out of comes out of the, of the limestone, and you can't do anything else. Right back to the Roman times, people have needed cement, people have needed to melt limestone, and produce what's called Portland cement. Now, there are various other things which I'll mention, and there's some things which can help a little bit, but just to bear that in mind, 64% of it comes from that. Our focus, and the focus of the cement industry to date, has been to focus on the removal of coal, and we're making significant progress on that. The, the particular activities we've been doing over the last number of years has been introducing new technology, which effectively takes out coal, and puts something else in instead. So, the, the, standard approach to this is to remove coal and replace it with a thing called solid recovered fuel, which is really a waste industry derived product. So, instead of incinerating waste you use it as a cement fuel, and that has been the driving force, maybe just mention one thing, the carbon intensity, if you note at the bottom of this is the carbon intensity of our cement clinker is point eight three two, so in other words, if every tonne of cement-, oh sorry of clinker that we produce, point eight three two tonnes of carbon is produced. So, it's a massive number. So, we manufacture about, well give or take, about a million tonnes of cement per year, so you're talking about 800,000 tonnes CO₂, there is really no other way to get out of that except start to focus on the, on, on the points in turn. So, I suppose what we've done is the fuel flex system which we launched about two years-, about a month ago, really was new piece of new technology, we did a piece of research with the, an equipment manufacturer out of Denmark, and we actually did a five year development cycle to actually introduce a new piece of equipment, it's a world first, and that allows us to reduce that point eight three down to somewhere around point, it's point seven nine.

So, a significant enough move. We have also some further work planned, which we're doing next year, which will introduce some of the same technology into the kiln stage, which again would be, kind of, getting out there in relation to the technology that's available in cement plants, but we're, kind of, pushing the-, we're hoping to push the envelope, and we've an objective in our sustainability plan to reduce our CO2 intensity by 33% by 2030. Those two pieces of equipment will take down somewhere around one third of that, it will get us to about one third of that 33%, somewhere around ten or twelve percent. So, a significant move even in a short space of time, it's, it's quite interesting, when we looked at this at the start, we said, 'How can we deal with this problem?' And when we actually look at it, begins to realise that actually there is some possibilities. There's other things which we can do, and it starts to get into some other technologies. So, the next one is a change of a burner. There's a new burner being developed by FLS, which is the cement, principle cement manufacturer of equipment in the world, and they're really hoping to introduce that to us at some point next year, with a view that we'd have it operational about '25. And the last one, I suppose is one of the difficulties you've got with cement plants is, you can do a lot with removing coal, but coal is a very, very high energy density carrier, and you need something, if you're going to get rid of coal, which is high density material, a high energy density material. Hydrogen is such a material, but it's very hard to get green hydrogen unless you have access to significant volumes of renewables, and funny enough, we happen to live in Fermanagh, in one of the highest yielding renewable energy wind sites in the country. The wind coming in from the North Atlantic actually, there's a number of wind farms there already, and that's why they've been put there, they're very high yielding.

So, what we've been trying is a number of projects now to start to generate significant volumes of renewable energy from new wind farms so that we can actually feed that directly into the cement plant for electrification, but secondly into the production of a high density material such as hydrogen, green hydrogen to get rid of the last lump of coal that we've got in the system. And I suppose, just to give you some, sort of, numbers then on that point eight three two comes, comes down somewhere around, on the fuel side, we can probably see ourselves getting rid of about 60% of that by 2030, and on the overall basis, we get down to about 23%. But that still leaves us with all this stuff that we've got coming out of the limestone, that actually doesn't help at all. So, I suppose, we'll come back to that in a second, but I suppose what we-, wanted to just talk briefly, this is the FuelFlex, this is the project that we launched to quite significant international acclaim about a month ago, and it's been very, very good for us. It actually has put us now in the position internationally that we have a significant story to tell, and within that we're now starting to see visitors coming to our plant. So, this is a visit from South Korea, a number of very efficient South Korean engineers, and it was quite interesting to see those guys coming here, we're typically going out to look at the new technologies that they're doing out in South Korea to see what's happening in the world, they were actually coming here to see some of the new stuff, so we're quite pleased about that. The new JetFlex burner, just to mention again, not to go into to much detail, but we're internationally collaborating with a number of plants.

We had a very useful collaboration with a project in Slovakia, which has introduced a new burner, and the, really the main point on this is to state-,

this goes to show that typically these are one pipe, you would have been pumping out large volumes of coal, out into the kiln and burning it to produce limestone. This very sophisticated piece of equipment allows you to do various things, oxygen, hydrogen, SRF, various other fuels, ideally aimed at changing from coal to a new, to a new renewable, a new renewable process. But there's a lot in that, there's a lot of engineering, and there's just, there's a graph, there's a plan there to show you these are significant engineering projects to change a cement plant from one thing to another, and you might wonder, well, you know, is, is this whole thing financeable? And it is a little bit of a concern, because there's a lot to do that, and I suppose, we've, we've a number of choices. We can decide that we can't produce cement any more, and lose our 800 staff, and reduce the economic wealth of the area, or we have to try this. And once you start to look at that, and look at that positively, and you look at the fact that you have wind, and you look at the fact that you have technology that you can actually do, and you look at the fact that there is a lot of positives coming to bear at the same time, and just really, just try and focus in on it, I think there's lots of things we, we, we've been able to do. I'll just mention also, because there's another stage of development around the whole concept of producing hydrogen in larger scale to do a number of things. The production of hydrogen is quite a complex process, it's quite energy intensive, but we're working with a company called Catagen, which is based in Belfast. A very innovative organisation and we're collaborating with a number of international and European players, to actually-, they produce hydrogen in a more efficient way.

So, we're now starting to develop the concept of taking waste heat from the plant, which is effectively free, and producing hydrogen, which can then be compressed inline and produced-, and potentially then, moved through that process to produce a syngas. Or, as it was mentioned earlier on, any diesel out of that process. Is it highly energy intensive, but the technology is now starting to come into play and I think, you know, hopefully there'll be some good stuff coming out of that. Just want to mention briefly there's a number of activities that we're doing, because this is not a one stop shop, you need to look at all sorts of things, I mentioned about materials, I mentioned about energy, I mentioned about efficiency, I mentioned about digitisation, and I mentioned about research. So, there's a whole series of things around this, and there's also the whole concept of what do you do with the cement once you have it made? Are you actually utilising it in the most efficient way possible? So, what we've been doing recently is starting to work with people like CarbonCure, they're an American company which actually take carbon and put into concrete products, ready mixed products, and from those products they can displace some of the cements. So, now we have a lower carbon, the carbon is sequestered fully into the product. You are actually producing less cement, and you're sequestering carbon. That's really a trial process, so when we get to the next stage of development, we're trying to take that 60% of CO₂ that's coming out of the process, and trying to capture it, then we have to figure out, what are we actually going to do with it? So, the concept is that we will start to put it into the products. Reduce the cement content in the product at the same time, and reduce the overall CO₂ intensity in the, in, in, by doing that.

I suppose, I just want to talk briefly then, a little bit about some of the things we've been doing, again we're based on the border, so we link up with Cavan County Council and Leitrim County Council, and obviously Fermanagh and Omagh District Council. So, we've been working through a process of trying to figure out how we can take it to the next step, and because of some of the things I've mentioned already

about high wind area, road fleet, we've developed this concept of a green hydrogen valley, which actually is now morphing into a green energy valley, because it, sort of, broadens out beyond that. There's a number of stages in this, and rather than me trying to explain these, what I'll ask is, if it's possible to run the video now. It's just a short video, explains the concept of this green energy valley, and then we can follow on at the end.

Video: Introducing Mannok energy valley, a concept with the potential to transform an already progressive industrial base into a truly sustainable power house of employment, clean energy, and future economic prosperity in the heart of the border region. Harnessing natural and renewable energy sources, driving innovation in sustainable technology. Replacing four million litres of diesel per year. Decarbonising the production of cement by removing over half a million tonnes of CO₂ annually. Powering three large manufacturing facilities with almost 150 gigawatt hours of renewable energy per year, in a closed loop process which utilises carbon capture technology, generated oxygen and green hydrogen, made possible because of the unique location and diverse nature of the Mannok business suite. A multi phase fifteen year energy transformation programme. Each of which are self financing, and will support the nation's net zero target. Energy valley underpins the numerous and wide ranging sustainability initiatives defined in the Mannok 2030 vision, and will bring us to within touching distance of true energy independence. Situated on the border between Northern Ireland and the Republic of Ireland, the region's unique opportunities make energy valley a particularly viable and potentially one off concept, with proven high yield onshore wind, and already existing high levels of curtailed and constrained wind capacity. High localised energy demand with large scale tethered road transport fleet, which can utilise hydrogen, or its derivatives, as a main fuel. High demand for oxygen, a by-product of the electrolysis process, which is normally vented, but in this context becomes highly valuable. A well invested manufacturing technology base, which facilitates the rapid adaptation to a new generation of new renewable fuels, including green hydrogen, oxyfuel, and synthetic fuels using existing access and utility infrastructure.

Renewable power derived from curtailed and baseload wind generation capacity close to the plant will be used to power a new five megawatt electrolysis plant, which will generate green hydrogen sufficient to convert over 70% of Mannok's 150 heavy goods truck fleet to fully renewable power. Oxygen generated from the process will be used to introduce a new, cleaner oxyfuel combustion cycle to the cement business. Combustion in an enhanced oxygen atmosphere improves burn efficiency, increases plant capacity and reduces emissions. The flue gases which are produced, contain less nitrogen with a high CO₂ concentration, making the carbon easier to capture and sequester rather than vent. This clean capture of CO₂ enables its permanent sequestration into ready mix and concrete products under a process known as carbon cure, which is already gaining significant traction in the sector. New dedicated wind and solar installations of up to 150 megawatt combined capacity constructed next to the cement plant, which will be designed to replace all current grid electricity demand. This will progressively replace over 50% of total energy requirement in the business with green alternatives over the next fifteen years. This will facilitate further cost competitive electrification of the cement plant, and the introduction of green hydrogen as an alternative fuel to the cement production process. It also will allow the existing grid sourced electricity demand from our PIR packaging and related manufacturing facilities to be replaced by direct connection to the new dedicated renewable energy capacity. Emerging technology in large scale

carbon capture and use will capture increasing amounts of CO₂ from the cement plant and combine this with additional green hydrogen to produce a new generation of synthetic fuels, including ethanol and dimethyl ether. It is expected that these fuel alternatives will enable the business to close the loop entirely in some application areas, where hydrogen is not a suitable fuel for direct use. Mannok is collaborating with numerous technology providers in the delivery of the transformation programme, which includes specialists in the renewable sector, as well as leading research institutions, government bodies, and international equipment providers. Realisation of the energy value concept will ensure the business becomes a truly sustainable entity for the next and future generations.

Kevin Lunney: I'm conscious of the time, but I suppose, what we've done on that is, you know, set out a, sort of, a very planned process, some of which will happen in the next couple of years, some of which is already in place. We've already-, you might have seen we received funding from BEIS for a project to take curtailed wind from an existing wind farm, to produce hydrogen in the first instance to replace the diesel in the lorries, and that programme has now started, and that study is now going in place, and that will take curtailed wind. Because we're on the west of the province, there's lots of curtailed wind that meant between 12% and 14% of wind capacity can't get back onto the network. So, this concept will actually take that wind, because it's free, and we'll take that and produce hydrogen, and use the hydrogen in the lorries. There's obviously challenges with the timescale for getting lorries, etc., but that's that, and then various other stages of that go through, which we've outlined in the overall plan. That's just some slides there which indicate we've actually started to do the work and where the wind farm will actually be located, and the scaling, and sizing, and engineering designs that I've started in that. And we've also included solar in that because solar and battery are probably going to play a part in this, if we're going to become a, sort of, a truly independent, energy independent entity. I suppose one of the things that's challenging for us is how do we-, once we do all of that, I think it's maybe important to point out one of the-, one of the big processes, or the, the big, the, the government policy in the UK is to-, for large carbon emitters, is this concept of carbon clusters.

So, what they're doing in the UK is, in the midlands and down south, and various places, they have this idea where you-, if you're in an industrial base, your carbon will effectively go into a pipe, if you're a large producer, and that pipe will be then piped out to, to either the North Sea or out into the Irish Sea, into, into disused oil and gas fields. So, I suppose, that's what the British government is putting on, they've put lots of announcements at the moment on how that's going to happen, and putting money against that, and this concept of carbon clusters, and that's grand if you're in a carbon cluster and you're fairly close to a pipe that can actually take your carbon, and go out and pump it into the North Sea, into the (mw 33.05). But if you're sitting in Ballyconnell or Derrylin, it's unlikely we're going to get a pipe to Derrylin. So, what we have to try and figure out is how do we deal with that? And those are the types of challenges we have. So, it goes back to that whole concept about sequestration of carbon locally, sequestration of carbon into products, sequestration of-, coming up with new ideas of how we take that, probably about 500,000 tonnes of CO₂ that will come from the limestone after, with all the other bits done, and coming up with new solutions. And we're integrating with various international organisation now, around ideas to do that. Carbonbuilt is one. It was mentioned about recycling concrete material, that's another organisation that-, there's an organisation focused on that. There's Carbon Re, there's Carbon Upcycling which specialise in taking carbon out of flue stacks and putting it into material which

can then be transformed into building materials or other things.

They're very early stage but, really, the point I'm making is that this is a multiple facet process, and takes significant effort to try to-, to do that. I think it also mentioned earlier on about ESG and how do you turn the tanker? I suppose, as a cement producer, we are probably the tanker. So, we're trying to figure out how do we actually get that done and develop our programme? So, we're involved, obviously, with people, very good organisations, businesses in the community, and they, who've helped us to come up with new thinking in this space, and I suppose I would encourage people to not be, you know, disillusioned about what's possible. We are probably at the very touch end of the wedge in this, but all the materials, all the cement that goes into any construction has to come from that, and we think it's important that we don't simply close the book on it and rely on cement producers from other parts of the world. We think it's important to have a, an ingrained, indigenous cement producer, here in Northern Ireland, and we also like to tell people that everywhere we go, we plant trees. Thanks very much.

Melanie Dawson: Thank you so much, Kevin, that was really interesting and, I suppose, fantastic to hear about the progress, really, that you're making on your collaborative international R&D projects. I mean, you touched on lots of things there, energy, digitisation, R&D, lots of different things, but one of the things that resonates with me is that the company just seem to have this culture of doing the right as well, and I think that can't be undervalued either. Okay. Moving on to our next speaker. So, up next, we have Liam McEvoy from SustainIQ. Liam is the co-founder of SustainIQ, and very passionate about sustainability and improving business competitiveness. Welcome.

Liam McEvoy: Thanks, Melanie. Good morning, everyone. I'm delighted to be here with you. We're going to spend about the next twenty minutes or so just exploring how we really should be taking a more data-driven approach to net zero, and our net zero goals and targets over, over the coming years. And before I get into the presentation, just picking up on a couple of the questions before the break. Someone had mentioned about demolishing or not, and if there was any examples. So, I would just encourage you to look at UCL, University College London did a project, the Bartlett School of Architecture, Gilbert-Ash delivered that. So, it's well worth a look, in terms of what they did there, and then someone else raised a point around social value and the policing of that. So, obviously, we know social value's going to be up to 20% waiting in tenders now, in Northern Ireland, to come in this summer, and the SIB have developed a whole new points system around how that's going to be policed. So, again, I would encourage you to look at the SIB website, just to find out a little bit more about the new points system as well. Okay. Just getting back then to today, make sure I've got that right, yeah, okay. I think, look, first of all, I'm going to very briefly run through net zero to make sure we all understand it, and we're all on the same page. Gonna take a look at some of the drivers. I know we picked up on that earlier as well, but I think it's important we know what the drivers are, and what's pushing net zero up our corporate agendas at such a rapid pace, particularly within our sector. I think it's important we understand our own greenhouse gas emissions within our own organisations, because we need to know that to, to, to, to really get the planning and get the strategy in place, and then how you can use those emissions to get started.

And again, for any of you in the room today that maybe haven't yet started, there's no need to panic. We've got a window of opportunity, and there's a few simple steps that we can all-, we can all take, and I'll wrap up by taking a look at some best practice examples as well. So, look, very briefly, obviously, I'm Liam, I'm one of the co-founders of SustainIQ. I've worked in sustainability and construction for around eighteen years, sixteen of which I had to drag everyone to the table kicking and screaming to have the conversation about sustainability. That's completely flipped now, in the last eighteen months, two years, more so to do with the carbon agenda and, and a lot of people now want to have that conversation, which is great. SustainIQ itself is the all in one ESG and sustainability reporting software solution. So, we make it easy for our customers to capture their sustainability data across all of their different projects, offices and factories, and so on, and then we make it easy through our reporting dashboard for them to report their performance to stakeholders as well. And we're really passionate then, about working very closely with our customers to make sure they use that data in the boardroom, by senior managers to help them make those big investment decisions that we're going to have to make, and Kevin just outlined quite a few there, down at Mannok, that, that, that they're doing. So, the data is critical to that, both in making an informed decision, but then also once you make that investment, measuring the impact it's, it's actually having, and again, you need the data to be able to do all of that. So, a little bit more about us later but, firstly, if we just get into the, the presentation around net zero.

So, again, I'm sure many of you already know this but just making sure we're all on the same page. Net zero means achieving a balance between greenhouse gas emissions put into the atmosphere and then those taken out. So, one of the best analogies I got a couple of years ago, which just made it click, was by thinking of it like a bath. So, reaching net zero requires us to balance the amount we emit with the amount that we then remove. And really, what does it mean for all of us here today? And how is it going to impact our businesses? So, companies are now setting targets to commit reducing their greenhouse gas emissions that are aligned with the pathway to, to limit global warming to 1.5 degrees above pre-industrial levels, and we're seeing more and more companies go public with their own targets, 2030, 2040 and beyond as well. Carbon removal and offsetting are going to be critical to that. I think it's important as well, we talk a lot about carbon but, obviously, it applies to all seven greenhouse gas emissions as well. So, depending on your organisation, it's just important to factor that in, and then net zero itself and why this is important, and why we're talking about this so much as well. Net zero is obviously an internationally agreed goal to mitigating further global warming, and what we do in the next ten years will really determine whether or not we've been-, we've been successful or not, and I think business, ten years from now, is going to look very, very different in terms of how we all operate our own businesses, particularly around the carbon agenda as well. And I think it's important, I think someone mentioned it earlier as well, it's not just us. I think sometimes it's easy for construction to feel like we're being picked on.

It's every sector, it's every country, and every industry that, that this is impacting, and it's important that we're aware of what that impact is on our own organisations, and what we're going to do to, to tackle the challenges that, that, that lie ahead. Okay. So, hopefully we're all agreed with regards to the net zero topic

itself, but then just looking at some of those key drivers and what is driving it up the, the agenda. We've mentioned a few of those international drivers, certainly the Paris Agreement, where a lot of the countries stepped forward and made this 2050 commitments, which we're now starting to see filter through. We've got the likes of the UN Sustainable Development Goals, SDGs, I know many of you in the room today have aligned their own ESG and sustainability strategies with many of the SDG goals. But then, nationally, we've got a lot of legal drivers, such as SECR, the Streamlined Energy Carbon Reporting legislation. So, again, many of you in the room today will already be returning their carbon emissions to Companies House, with their financial returns. We've got other pieces of legislation, such as ESOS, the Energy Saving Opportunity Scheme. In the EU, before Christmas, they signed off on CSRD, the Corporate Sustainability Reporting Directive, which is very much aligned with non-financial reporting, and that's going to impact all of us, operating within the EU, potentially, over the next couple of years, and then we've got GPP, Green Public Procurement, again, in the south, which is now tied up within all public tenders, public procurement contracts. So, anyone there tendering for work, potentially impacted by GPP as well. And then we've got a lot of commercial drivers as well.

So, obviously, we've spoke a little bit about those PQQs and tenders, and in particular today, we're focusing on net zero. We're seeing a lot more net zero questions coming through and there's a hunger, I think now, for data to support that, that you're doing what you say you're doing. So, those clients now want to see evidence of, of your, your drive towards net zero as well. So, having access to data for that is, is critical. Clients themselves are a lot-, in terms of their expectations, they're, they're quite hungry for their suppliers to step forward and take the lead, work with them collaboratively to try and work towards net zero goals as well, and we're seeing a definitely increase in the amount of clients of our customers that are looking for carbon reduction plans. They want to see what the next ten, fifteen, twenty years looks like as well. So, there's lots of drivers. We spoke a little bit about stakeholders as well. It's not just clients, I know Lorraine had mentioned that McAvoy Group are under recruitment, particularly of new recruits coming in, having a focus on responsible businesses and so on. But, certainly, your employees, your subcontractors, your suppliers, if you've got investors behind the business. Again, investors now want to make sure they're not investing in a company that is negatively impacting the environment or, you know, negatively impacting the local community somewhere. So, they're doing their due diligence, and they're using ESG to do that, and again, in the, the, the public themselves. Everyone, now, is more aware, and they want to work for, or they want to work with responsible businesses. So, lots of drivers there, pushing it up the agenda. Carbon itself, obviously, has been monetised, which is why I've never spoke to so many finance directors in my life as I've done in the last twelve months. They're obsessed.

But it, it definitely is having a, a big-, a big impact, and the fact that we're now seeing, in the UK, companies that meet a certain criteria, returning their carbon emissions to companies house with financial returns, it, kind of, gives you an idea where this is going. There's, there's going to to be-, there's going to be money, taxes, whatever you want to call it, in the not too distant future. So, we've got this window of opportunity to do what we need to do, to try to, to make those investments. Similar to what Kevin was talking about down at Mannok, build a business case. If you were paying for it today, what, what, how much would it be? And use that as a business case, to start looking at future investments, to help drive down emissions within, within the business, looking at maybe transitioning over to EVs, investments in

renewables, whatever it might be. But it's important to start building those business cases. Some of them will be low hanging fruit, can be done quite quickly, some of them will require significant investment, so you need to build in time to, to plan for that as well. Okay, and then I think as well, it's very important that you understand your own emissions within your own businesses, and the impact all of this is going to have on, on you. So, again, a lot of you will be familiar with this but the Greenhouse Gas Protocol has broken emissions now down into three scopes, and we're all now talking about either scope one, scope two or scope three. Scope one being direct emissions. So, typically, your, your company fleet of vehicles if you own them and, you know, you're paying for the fuel. If you're bringing fuel on sites for, for plant equipment, for welfare, all gonna be scope one.

Scope two, typically, would be maybe electricity, your, your, you know, it's being produced off-site, you're using it on-site. But with regard to scope one and scope two, you're all paying for it. There's invoices in your businesses, there's a bill there, and you've got direct influence over what you can actually do to reduce those emissions. So, for example, in scope one, as a business, you could start transitioning over towards EV. You've got the control to do that. Scope two, again, with regard to even electricity, you could go to a green energy tariff, you could invest in renewables. So, you've got the control and influence over one and two to do that. Scope three is very different. Those are emissions that are happening because of your business activity but they're outside of your control. So, typically, maybe supply chain products and materials being delivered to site, that type of thing. But it's important, and then scope three, by far, will be your biggest chunk of emissions and you will be expected to report on that as well. So, the focus, certainly on scope one and scope two, but you can't forget about scope three, you can't kick it too far down the road, people want to see those reports now as well. And again, that, that diagram just really sets out and, and again, sort of, hopefully, you know, by looking at it will help a lot of businesses understand, 'Well, what is a scope one? What is a scope two and what is a scope three emission within our business?' And then you can start, sort of, looking down, and drilling down, and, and, and identifying the different emission sources across the business as well, both upstream and, and downstream. So, it's really time to just start asking lots of questions within the business, to really understand your, your emissions.

So, again, what emissions does your company produce, you know, across scope one, scope two, scope three? Looking at those bills and those invoices for electricity, for fuel, whatever it might be, and, and starting to understand what, what is being produced first of all, and then it's important to drill down a little further, and, and why are they being produced within the business? What, what business operations are they related to? Where are they being produced? When are they being produced? Who's producing them? Asking all of these questions helps you to then start-, to build a bigger picture of emissions right across your organisations, and that is really critical, to understand all of that as you move forward in the next couple of years. Are they direct through through your own business or are they indirect, maybe through supply chain? And again, who's responsible? And once you start capturing all of that, you can start to calculate how many tonnes of CO₂ you're producing, and I, I, I think that's critical to build that, almost like a carbon inventory, where you really understand-, you really understand your business, your emissions, and the impact all of this is going to have on your, and then you can start to plan going ahead, to maybe start reducing them as, as well. And then, once you have all of that information, it's important you start using it. So, there's a lot of businesses out there that have a lot of data but they're not properly

using it to the full potential. So, I think it's important that, that you now start looking at it and, and understanding it, and, and how it can help you then make those decisions in terms of strategy going forward, and so on. So, yep, really just start interrogating it, looking at it, why, why maybe certain emission sources are, you know, how if you even just look at construction, why is one project producing a lot more emissions than the other, maybe completed six months previous, similar value, similar sector?

You know, when you start just asking those, those questions, there might be factors that couldn't be avoided but, again, you start to see then trends coming through, and it's those trends, really, that are going to highlight the opportunities, particularly the low hanging fruit where you can-, you can have a big impact quite quickly as well. So, again, it's important then to understand by having all the access to all of that data, you understand your, your current position. So, you, you set the baseline. You understand where you are, right here, right now. You put your targets, your KPIs in place, you know where you want to get to, and then you continually review performance so you know where you're at if you're going in the right-, in the right direction. So, it's a continual monitoring, measuring and reporting process, which is where we come in with regards SustainIQ as well. And again, the focus, initially, for those of you maybe just starting out should be on one and two, but again, not forget about scope three as well. And then it's important to make a start. So, again, I know a lot of this can be overwhelming, and, you know, we're all now starting to talk a new language, particularly around carbon, and so I think the best place for everyone to start is education. It's critical, it's key, with regards your own employees, with regards your supply chain as well. We've all got a responsibility to bring everyone with us on this journey, we can not run the risk of leaving people behind, and as you say, we, we are-, we are speaking a new language then. So, it is really up to us to, to invest in education and, and increase the amount of understanding and awareness around the carbon agenda, so that we can bring everyone with us on, on the journey as well.

And those are just, like, five key steps that we like to, to implement with, with all of our customers, just to get everyone started. So, it's, again, finding out and understanding your emissions, where you're currently at right now with regard to your own business operations, put that baseline in place, make those commitments, put those targets in place. You know where you want to get to. Create a plan and a strategy, how you're going to get there, what investment is needed to get there. Constantly implement and report on, on performances as well. So, and there's, there's of support out there as well, for all of us, and I would highlight a few. So, Business in the Community. Kevin, again, in his presentation, highlighted BITC. They're a local organisation and they can help you get started on your journey. They've got the BITCNI Climate Action Pledge, which you can all sign up to. It's a really good place to start with regards reporting. The UK Green Building Council is another really good resource. On their website, they've got lots of template carbon reduction plans, and so on there as well. So, I'd encourage you to go there and, and look at that. And then, we ourselves have got the six, six step guide to getting started with ESG and sustainability reporting. So, I'll share that with Invest NI and maybe that could be shared with delegates here today as well, it's just a (mw 51.23) . It's a full ESG guide but, obviously, net zero is part of that, so we can share that with you all as well. Okay, so just to wrap up and take a look at some examples, they are SustainIQ customers that we're going to look at, just to give you a little bit more information about SustainIQ itself. So, it's a software solution built across those four pillars because, for us, it was important that we built a solution that captured data from all aspects of sustainability.

There's lots of standalone elements out there but we understand the power of bringing it all into one place, one dashboard, and so we achieved that by building SustainIQ across the four pillars that you see on-screen. So, responsible procurement focuses on all things to do with supply chain, products and materials. We've, we've just launched a, an embodied carbon calculator for products and material. It's a prototype that's currently being tested, and we rely heavily on the likes of the EPDs, Environmental Product Declarations from the manufacturers to do that. We've integrated with things like BIM so we can pull through the design stage lists of products and materials as, as well. And there's a supply chain portal in there, where you-, our customers can then collaborate with their supply chain because, again, looking at the direction of travel here, it's going to be really, really important that our customers can engage with their, particularly their key suppliers. They're going to be setting specific targets for those key suppliers over the coming years, and they need a space to collaborate and work together, in order to achieve those, those goals. The environmental management pillar then, it just tracks all of the environmental performance across all projects, office, factories, all waste management, all greenhouse gas emissions, scope one, two and three, biodiversity, water usage, and so on. People, health and diversity, then, is us moving into social values. So, typically there, we would be capturing apprenticeships and placements opportunities that are-, that are being created, health and wellbeing, diversity and inclusivity, training and development, safety, and so on. And then the fourth and final pillar is community engagement and partnering.

So, there we track all of the performance around community initiatives, volunteering, charitable donations, school engagement. So, we bring all of that in to one big central dashboard, and we do that through lots of different ways. We've got an API which allows for connectivity, so we can pull data automatically from different places. We've got bulk uploads so spreadsheets can go in very easily, and then we've got the SustainIQ app, where site teams are actually logging information straight into the app manually as well. So, it all comes into one big dashboard, and there's lots of tools, and functions where you can drill down, interrogate the data, and then, within that, there's a reporting library where they can customise lots of reports for stakeholders. So, we typically have customers delivering (inaudible 53.57) or lead, they may be reporting on GRI and, and all of the other, sort of, different, sort of, legislation, and also sector standards as, as well. So, obviously, it does the full ESG thing. Today, we're focusing in on the, the emissions piece. So, just to give you an example, Gilbert-Ash is, is one of customers. Obviously, a UK, Northern Ireland contractor, operating across the UK. So, Gilbert-Ash use SustainIQ on all of their projects, they use all four SustainIQ pillars. So, they've huge amounts of data coming in to the system every day, across all of their different projects, and again, they're able to use that to-, within their tender submissions, you know, to report back out to clients and regulators, and so on. So, looking at one of their Premier Inn projects that they completed recently over in London for their client, Whitbread, and Whitbread's very passionate about all things sustainability and ESG related.

So, Gilbert-Ash are able to just take a lead there, and they've got access to huge amounts of data that they can then share with, with their client. So, they use SustainIQ to track performance across the job, and even from an emissions perspective, they were able to, to track the 21% of their scope one emissions were

produced on-site. Then, scope two was 4% and, again, scope three being the biggest chunk of emissions on, on, on that particular project, and scope three for them, typically you're looking at deliveries coming to site, we've integrated with different sign in biometric software as well, where we're able to pull through a lot of information around how supply chain subcontractors are travelling to and from, from work as well. So, they're getting huge amounts of visibility, huge amounts of transparency, which, again, they're able to use and position themselves as a leader in this space, particularly with, with their clients as well, and that's just one job. Obviously, they're doing it across all of them. Felix O'Hare would be another customer of ours, obviously based in Newry but working both in Northern Ireland and the Republic of Ireland. Similar to Gilbert-Ash, they would be tracking their performance across all four pillars, and across all of their, their projects as well. So, again, getting huge amounts of data through SustainIQ, that they're able to use in lots of different ways to help improve performance within the business. So, again, over at their St Paul's National School and Navan project that they completed, they tracked all their emissions but with regards to their, their scope three, 64% of all emissions on that job was related to that, and again, it was very much to do with supply chain, a little bit of product and materials as well.

But, forensically, actually tracking all of their emissions across all of their, their projects, and they're now actively using that data within the business to really drive performance, and, and try to get their emissions down on projects going forward as well. So, look, there's a lot more on our website, case studies and testimonials, SustainIQ.com if you want to have a chat, find out a little bit more, you can get us on Hello@SustainIQ.com as well. Okay, thanks very much.

Melanie Dawson: I'll just ask Kevin to come back up as well. So, again, lots of really interesting insights there from Liam on the SustainIQ platform, and indeed, I'm a big, passionate fan of data and love to see whenever it's included in platforms like that as well. We're going to open it up to the floor now for some questions. So, again, same as last time, if you want to put your hands up and if you have some questions for Liam or Kevin, they'll be happy to answer those. Who's going to go first? In the middle there?

F: Hi, Una from Felix O'Hare. I'm just wondering in terms of the environmental product declarations, do you see that becoming widespread across the SMEs in Northern Ireland? Or do we need to rely more on the UK average data to feed into that, for the whole life carbon accounting?

Liam McEvoy: Yep, I'll go, Kevin. So, so, yes, look, obviously, at the minute, we, as I say, have got that prototype out on our procurement pillar at the minute, and it is designed and built around the data that we need to get from the EPD. So, we are out there, speaking with the manufacturers. Certainly, we're seeing the larger manufacturers have a lot of this in, in place. You know, obviously, they've, they've invested. We, we, you know, when you start looking at maybe the smaller manufacturers, it's, it's getting a lot more patchy. There's, there's not the same level of provision available, but I think there's a recognition that that needs to change, and I think a lot of manufacturers are, are making a start on, on that. But at the minute, currently, there's, there's, there's not the same level with a-, with the smaller manufacturers. But it, it will, and, and, you know, I'd say in the next eighteen months, two years. There's also a lot of support, certainly

even Invest NI, helping organisations (mw 58.38) EPDs together, because they're, they're being asked constantly now, particularly by main contractors to, to provide that, that information. So, there's a bit of work still to be done there, but definitely becoming more and more readily available.

Kevin Lunney: I would add to that, yes, I mean, we supply heavyside product into Ireland and the UK, and we, we have EPDs for all the individual products you wouldn't get on a supply list in some of the manufacturer-, or some of the distributors in the UK without having EPDs. So, I think they're standard, you just need them.

M: One for Kevin, please, and may I say what a fabulous presentation.

Kevin Lunney: Thank you.

M: And, and what a proposal for the future, it's really, really something special. My question is twofold, Kevin. I'm interested in mobility and decarbonisation within mobility. So, when you talk about decarbonising your heavy commercial vehicle fleet for distribution of your products, roughly, within the plan, the footprint that you've given us, roughly what is the timeline before you've got hydrogen available for your vehicle fleet? And, sorry, is it hydrogen for internal combustion engine, or is it hydrogen for hybrid, for fuel cell electric?

Kevin Lunney: In terms of the-, when we might have it available, we're starting into the FEED study that we've got some funding from BEIS on-, we're starting that now. So, we could probably have that built within two years. Our challenge though, with that, is that the vehicles are not available. Yes. So, look, we're engaged with the various manufacturers insofar as we can engage, and there are some exemplary studies and implementations in Europe. Particularity in Switzerland, where they have actually implemented a number of heavy goods vehicles. The challenge with heavy goods vehicles, I mean, you're carrying material. Electrification, obviously, would be simpler but electrification doesn't give the level of power that you need to haul heavy goods, you know, 30, 35 tonne. So, the challenge is, is, is the manufacturing companies, the Volvos, the Mercedes, etc., who are actually going to produce this equipment. So, we're, kind of, working on that. I suppose there's a-, there's a couple of things we've tried to do to, to mitigate that. We can use the hydrogen in the lorries, or we can actually use the hydrogen in the cement plant. So, we've a little bit of an opportunity there. So, we're trying to press ahead with production of the hydrogen from the curtailed wind, and then extend that. But, ideally, we want to get those lorries off diesel, so we're, kind of, working on that. But we are at the mercy of when those things become available. Second question you said, look (inaudible 01.01.25) interesting, very interesting question. We are looking at, in the first instance, the extender system, whereby you produce hydrogen but it's really an electric vehicle that is extended by having a hydrogen tank on the truck.

So, that's, kind of, what our main focus is, but working with Catagen, that we've spoken about there, one

option there is they have a relatively efficient method to take the hydrogen and compress it, and convert it into a e-diesel, and if we can take the CO₂ out of the stack at the same time, then it's a win win. So, one option might be that we would look to a drop in solution, at least maybe for an interim period, because we may be able to produce that relatively cost effectively.

F: This is one for Kevin. Eve Smith, W&J Chambers in Drumahoe, Concrete Yard. Just in relation to carbon cure, I'm aware Kilsaran and yourselves, and I'm actually working on different, kind of, thing with the University of Ulster, and also Queen's and Trinity, in relation to low carbon concrete. But have you physically poured with carbon cure yet, is my first question? And also, the strengths, if you've physically poured, have you had it in place any length of time, and done any analysis of the strengths over a period of time of having it test poured in situ, in relation to durability, strength, and also, I suppose, practicality, after it's been in place for a length of time?

Kevin Lunney: Look, we're at the early stages of it. We've installed the tanks, we're starting to produce concrete with it. We haven't done it at scale, and we don't have a very large ready mix business. The reason why we've got into this space, to try and get involved with it, is really to try to test out the concept and how it might perform at much larger scale, because we have huge volumes of carbon, and we're trying to figure out is there a business case in that to produce it at large scale? So, I don't think we're at ready now to give you any definitive answers on it. From the initial analysis, kind of, we went into it with our eyes open. It's not-, it's certainly not a silver bullet for this. It will potentially reduce the cement content to proportion, but in proportion to the amount of carbon we've got, it's minuscule. So, look, I understand the point and it needs a lot of testing. I think it's a factor of this is what you're going to come up against, almost immediately with standards, and durability, and all these things, that are untried. But we're doing it at the moment, really, to learn from the exercise.

F: Thanks very much.

F: Hi, Gemma from RBMC. We consult with our clients on risk management and commercial best practice, and this question is probably more for Liam. There would be a lot of construction companies that are, say, traditional in the way that they work, and the jobs that they undertake, what would you say is holding them back from making advancements? Be that digitally or sustainability wise, and what do you think it's going to take to push them? Is it purely just legislation or is there something else that's going to encourage these more traditional companies to make those steps forward?

Liam McEvoy: Yeah, okay, good question. I think, look, there's lots of challenges. I think one of the biggest, because we're, kind of, in that data capture lane, one of the biggest challenges for a lot of the construction companies is access to data. So, whenever we start working with a customer, typically, we find that a lot of the data is already held. Not all, but a lot of it is already held within the business, with regard to ESG, sustainability and, particularly, the emissions information, but it's all siloed. So, it's living in all their software systems, it's in desktops, it's on spreadsheets and nothing is joined up, nothing's talking to each other. There's a lot of rules and responsibility, responsibilities, and lots of different

departments now that are involved in sustainability as it's evolved over the years, and they just don't realise how important sharing that information might be for others in, in the organisation. So, I think that siloed approach that many are currently having to deal with is, is, is one big challenge, and it's, like, where, where do we start? But I think, also, that, you know, that, that leads into the fact that ESG, sustainability as a whole, it requires huge amounts of information, and I think, in the past, there was such a strong focus on environmental. That in itself is a big task, but when you look at the S and the social now, you know, you're dealing with the HR departments, you're, you're dealing with the stakeholders, and then you're looking at the G and you're bringing in procurement. You're bringing in supply chains as, as well. So, there's huge amounts of information that's now needed to be brought into one central place, so that companies are able to get a full overview of their performance, and, and properly put a strategy in place, and put those targets in place as well.

And I think, like, with regards, I suppose what is needed to, to help push, push them along, we're seeing, in the last twelve months, we're seeing a huge uptake, and I think that's coming, maybe more so through procurement, through tenders, through PQQs. Anyone working on those larger frameworks, for example, are now obligated to, to be reporting. So, that's definitely pushing things along, certainly CSRD in the EU has had a massive impact there too. So, I think a lot of companies that, before, weren't maybe overly bothered, now realise this is going to impact them from 2025, going, going forward. So, definitely legal drivers also add a, a, a bit of a push. But as I said in my presentation, I think one of the key things is education and awareness, because I think, you know, when, when I-, when we start talking to people, you can see they're, they're quite overwhelmed by it all, and they've no need to be because you can break it down into, into, into different, sort of, chunks. But I think it's easy to, to get overwhelmed, and I think by educating employees, and certainly working with the supply chain, make it a lot more manageable, and realise that, that actually, they've got time. There is a window of opportunity here to, to make a start and get a good plan in place.

Melanie Dawson: Okay, I think that's all of the questions and I you'd all like to jut put your hands together and thank both Liam and Kevin for their presentations. It was brilliant.

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Moderator questions in Bold, Respondents in Regular text.

KEY: Unable to decipher = (inaudible + timecode), **Phonetic spelling** (ph) + timecode), **Missed word** = (mw + timecode), **Talking over each other** = (talking over each other + timecode).

Melanie Dawson: So, we're going to go on to the third and final piece for today. So, I'm going to invite up onto the stage next, Daniel Purdy, Energy and Resource Manager at Invest NI, John McClune, Operational Excellence Manager and Richard Pelan, R&D Innovation Manager. So, if you'd like to take a seat, we're going to put them all in the hot seats here. I've asked each one of them, so they each have one slide and I've asked them to explain in as simple terms as possible, really, what their role is, and indeed how they can potentially help the people who are in the audience. I have some questions lined up then to ask them straight after that, but if you want to start thinking of your own questions as well, I will pass it out to you afterwards then as well. So, you're very welcome on stage. So, first up, we'll have Daniel. So, Daniel, if you'd like to tell us a little bit about yourself and indeed the work that you do.

Daniel Purdy: Hi, I'm Daniel Purdy. So, I manage the Energy and Resource Efficiency Team within Invest NI. So, our team, as you can see there, the role of it is to help businesses save on costs and on carbon. We do this by helping them to identify solutions, you know, to use materials and energy much more efficiently, thus helping that business become more environmentally sustainable. So, we've, we've a team which provides advice and guidance to all businesses. We also provide signposts, and some of the signposting will be to some of our schemes here. First up is our technical consultancy. So, this is a free service to all businesses in Northern Ireland. The only criteria we ask is that their combined spend on materials, energy, water, waste is greater than £30,000. In fairness, £30,000 today doesn't buy you an awful that. So, that allows us to work with an enormous amount of companies in, in, in various different sectors, you know, across Northern Ireland. So, the consultancy, effectively, the way that works is we will send a consultant into your business. There may be a specific project that you're wishing to look at or there may be just a general, sort of, inquiry. How can we reduce our energy costs? They're the experts, so they'll do the digging. They'll come up with the solutions. They'll provide you with recommendations with a report at the end. Essentially, what that does is it provides you with the information that you can then make an informed decision. Should you pursue the project? You know, is it worthwhile for your business? You know, and we cover, you know, an enormous amount of, sort of, different areas. We could be looking at energy, looking at light and compressed air, heating, that type of thing. In terms of materials, we could be looking at waste streams, you know, embedding circular economy principles within your business. We could look at water efficiency and even bore well feasibility on your sites. The next scheme then is resource matching. So, I, I, I suppose this is open to all businesses in Northern Ireland, and I suppose the ethos here is one man's waste is another man's gold. So, when a company produces waste, we would like to classify it as a, a redundant material. We want that redundant material to be passed on to another business where they can use it within their product or within their process. We have a, a company that carry this service out for us. Ben, if he wants to maybe stand up and, and, and wave if he's still here, yep, there he is.

So, if anybody wants more information and would like to, to speak to him further about it, you know, you can chat to Ben afterwards, but essentially those guys have databases full of companies that would have redundant materials, and then they'll have another database full of companies that have wants. So, they, they're the companies that are looking for this other material. The aim then is that the match is made up and it should be mutually beneficial for both, both businesses, you know, financially, but also environmentally, because effectively what we're doing is we're stopping material going to landfill much sooner than it should. We're getting an extra use out of it and again, this is, sort of, the circular economy principles which we're embedding into businesses. Lastly, then we have our resource efficiency capital grant. So, it's quite timely that we're having this event today, because this grant closes on 16th of May. So, this is for Invest NI clients only. So, if, if anybody is interested, contact our client advisor and then we can, sort of, take forward an application with them, but the aim of this grant is to support you to buy capital equipment that will allow you to reduce the amount of materials that you're using within your business. Typical projects could be CNC plasmas, CNC saws with nesting software, paint booths. We could look at water efficiency, that type of thing. We've done carrot peelers, we've done onion peelers, so there's no right or wrong answer, answer to this. You know, anything goes. The acid test would effectively be if this new piece of kit helps you save material and you're bringing less material in through your front gates, you know, then, then, then you should, you know, this could be an eligible project for you. In terms of grant size, it's a £50,000, it's capped at £50,000. Small businesses get 30%, medium sized 20% and large businesses get 10%. You know, so it's, it's quite worthwhile and, you know, if you look at that, sort of, the benefits coming from it, there's not just material benefits with new equipment, there's a lot of other benefits, energy, labour, that type of thing. So, it's, there's a lot to consider here, you know, with this, in this grant, or sorry, within this grant. That's our offerings now, quite sort of, a brief overview of them, you know, so if anybody has any specific project type questions, you know, I'm, I'm happy to answer the questions or even outside afterwards. Thank you.

Melanie Dawson: Thank you. Next, then, we have John. So, operational excellence, John, obviously pivotal to making improvements in productivity. Tell us more about that.

John McClune: Okay, yes, I head up the, the operational excellence team and it's interesting, there's quite a number of companies in here we've either previously engaged with or are currently engaged with, and I suppose our, our main focus is trying to get companies to focus on improving their productivity, which, ultimately, then has an impact on profitability, and if you were looking for an advert in terms of operational excellence, you would look no further than Kevin's presentation, in terms of Mannok and the, the leading excellence. So, if anybody's keen to get on that journey you can-, you can contact, contact me or the team, and we can hopefully help you get on it. The way we, we tend to work, unlike Daniel, I don't have grants. Typically what we will do, we will work with people within your business and build up their capability and a lot of the tools and techniques to drive, drive those continuous improvements in productivity improvements. So, that's a combination of training and then on-site one-to-one coaching and mentoring in terms of the implementation or adaption of some of those tools and techniques. I suppose the, the main focus there, as it says up on, on the board, is we're, we're trying to come and help you guys, or the companies we engage with, to, to look at the work and how can we make it easier, how can we make it better, and if you get it easier and better well tell you what, you're going to-, you're going to be

getting it faster and you're going to get it cheaper. So, that, that's the, sort of, the, the main goals that we try to drive through. You can see that if anybody's interested, my, my number's there. We have an OpEx query email, so if anybody's interested, follow up. It's just opex query at Invest NI dot com. I would also then just highlight a colleague, I suppose, coming through post-Brexit, EU exit and, and the pandemic. One of the things that we have done is beef up and enhance our supply chain support. So, I would imagine that most companies here have a supply chain and you've probably got issues with it in terms of it's not that resilient. You know, if you look at some of the things that have happened recently, there's a lot of risk in it. So, if you're interested in and, sort of, identifying and being able to mitigate the risk within, within your supply chains or build in that resilience, there's an-, there's an email address there. My colleague is at the back, Clive, Clive Stewart, but you can reach them if you send a query then to supply chain query at Invest NI dot com. As you can see, we're, we're quite innovative with our email addresses.

Melanie Dawson: That's great, okay, and then we have Richard on the end. So, Richard, you look after innovation and research and development, and innovation is probably a word that's been used half a dozen times or more already this morning and has been touched on in lots of the presentations. Can you just share with us what services your team offer as well?

Richard Pelan: Yeah, sure. As Melanie says, I'm, I'm innovation advisor within the R&D team. So, we cover engineering, construction and transportation, but even more broadly within the advanced manufacturing team we look at materials and energy as well. So, it's all sort of things that are relevant to the construction sector. I'm usually the first point of contact if you're thinking about an R&D or an innovation project and act as a bit of a gatekeeper for Invest NI. So, kit guitars (ph 09.10) on your project and see how it fits. If it doesn't fit, then maybe advise on how you look at it differently and, you know, maybe approach the problem differently or help make connections to, to improve it and that's, I mean, that's fundamentally-, most of my time is spent engaging with companies, talking through their projects, seeing how it fits. Does it fit with Invest NI funding or is it other funding? And then helping them make the right connections. Chris mentioned earlier, the catapults. So, it's not just the local connections. There's probably a lot of similarity, actually, between what I do locally and what Chris does nationally, but locally I would help companies make those connections locally, but also then reach out to the likes of the KTN network or the catapult network to see where companies could engage with those entities to help develop their projects further, or maybe look at different solutions or where somebody has solved that problem already. Just put them in touch with others so they can talk through it. And then it's, it's, it's about then coming back, whenever we get into the process of finding what the right approach is to fund that mechanism, engaging with them throughout that process and helping the companies through that process as well. So, helping with their applications either for Invest NI funding, or externally if it's going for Innovate UK or BEIS funding. I'm always happy to come on as a, a partner on the, the application process so I can comment directly on it and add thoughts to it and help develop it and feedback to them before they actually submit, and then just take me off as a partner before you-, before you put it in. What we then have ourselves are two main mechanisms within the R&D team. We've got project definition which is support for Invest NI client companies. They help them scope out their R&D project to spend time, support their internal costs of the time they spend scoping out, planning that project, understanding where the issues are, who they need to engage with to help them overcome that, those issues, how long it's going to take, how long-, how much is it going to cost but also on the other side then what's the benefit of, of doing that R&D project as well?

So, it's all, all about trying to de-risk the R&D project before you, you spend the big money or start cutting metal on the project. It's all that upfront work to help improve the quality of the R&D project itself as far as the innovation within it but also then help plan it out and de-risk it, know that you understand where the risks are within that and you've considered that within the, the project definition. So, from project definition then we would expect the main deliverable would be an application for the next stage for an R&D project. That could be an R&D project with ourselves or it could be an application to the likes of BEIS or Innovate UK or DESNZ or whatever BEIS are called now. So, that's, that's an equally good outcome for us. Also, if you've done a project definition and you've realised, like, this, this project isn't for us, we're not at the right time, we didn't realise the complexity of it, the cost of it, or the market doesn't exist for it then all we want is a report to say you're not progressing and again that's all part of the de-risking project that you don't jump into an R&D project too quickly and too soon but hopefully you do and then the next stage of support is our grant for R&D where we can support you to actually develop a product, a process or a service right from first concept through to commercialisation of it. So, again we can support your internal costs, any external consultancy costs, subcontract and manufacture, any material costs, any travel, accommodation, third party trials and tests and validation. If there's any IP that's generated from the R&D project we can support the cost of that but it's all the cost to get you to the point where you can properly commercialise that R&D project. I'm happy to talk to anybody about any project, you don't have to be an Invest NI client company to engage with me, you have to be an Invest NI client company to, to get the, the grant support but I'm more than happy to figure out what's the best approach for you. If you're going for Innovate UK or BEIS funding you don't have to be an Invest NI client company either but I'm as I say more than happy to engage and help through that process.

Melanie Dawson: So, I'm going to go back just with a, a, a handful of questions here, so I suppose the first one Daniel perhaps if you can answer this one but from an energy perspective we heard a lot from Liam there just about the, the need for carbon reporting and again businesses will be feeling the pressure to do that going forward. What support can your team potentially give in terms of carbon reporting or helping organisations with that? Do you have anything available?

Daniel Purdy: Yeah the technical consultancy there which I said is free to-, free to businesses, you know, the consultants can go in and basically look at the energy that you're using and the processes that you're doing and, and where the carbon may be coming from and then they can effectively take a, a measurement there and, sort of, allocate the carbon associated with it. Now scope one and scope two are covered, scope three is which is-, you may appreciate is quite a-, is quite a large type of a project and our, our free consultancy lasts for five days, you know, so we probably couldn't stretch out to scope three but we can get what you're doing within your premises, you know, in terms of carbon. We also have basically listening to what companies need and what they're asking us for and we've modified some of the technical consultancy offerings and we call them sustainability reports and what they do is they pretty much take a snapshot of your business today what you're doing, you know, in terms of energy, material use, water use if you're producing effluent we can look at biodiversity things like that there's several different categories on it and the aim is that, you know, we can allocate carbon to the various different areas. You have that carbon figure then that you can, you know, report on or use for your reports whatever accreditation it is that you're, you know, working towards and the aim will be that you're going to be seeing where you're

producing carbon, you're going to be wanting to maybe implement some changes, some recommendations. Next year you do the same exercise, you take the snapshot yet again and you can see hopefully that you have improved so, so that, that's what we can offer there, you know, you know, so it's a-, it's a-, it's a wider business picture that we are taking here as opposed to maybe just even project specific.

John McClune: Maybe just to pick up on that again if, if you have inefficient practices or processes you'll probably find that you're using more energy than, than you need so again we would tend to work quite closely but with, with Daniel's team as well in terms of, 'Okay there's high levels of energy usage, how can we help, help drive that down in terms of the usage?' And I'll maybe just highlight for anybody the, the smart manufacturing data hub University of Ulster offer, it's actually quite a-, they will come in and provide sensors and the data analyst who come in and install the, the sensors, it could be in your, your feeds and it could be on the machine on the-, on the motors where they can actually capture the data, they will then analyse the data create the the dashboard for you so then you can go and do your action about it. So again if anybody's interested in, in finding out about that I would imagine if you talk to Richard, Richard and myself we can point you in the right direction up to Ulster University.

Melanie Dawson: Great thank you. John one for you then so indeed in the room we have lots of successful businesses here but I, I suppose from that perspective, you know, should successful businesses also be considering adopting operational excellence or lean or is this just for those who are behind the curve?

John McClune: Oh absolutely, I mean, if you look at the title of the-, of the conference that you've all-, you've all signed up to, you know, go digital, improve productivity, achieve net zero it's, it's all tied, tied together again, I mean, if you-, if you all think about how you do business you all do businesses, you know, three processes. If you look at your process is the question I would ask how efficient are you in delivering those, those processes? You know, there's a lot of inefficiency in terms of how we actually do the work whether we're big companies, small companies, service companies, manufacturing companies, whether we're in the construction sector, whether we're, we're managing projects. Again if you think about your processes typically you will have people and people are coordinating, I don't know, information, materials, equipment, other people and that's where you tend to get the inefficiency so it's trying to be able to understand what's happening in your processes and then how do we drive out those inefficiencies.

Melanie Dawson: Great thank you. And then Richard I suppose a lot of people find R&D and the application process and everything can be complicated and I suppose to further complicate things we hear about R&D tax credits and, and different things like that as well. So I suppose can you just give us a bit of insight really on how some of the grants that you mentioned of project definition for example, some of that, sort, of R&D funding compares to the likes of R&D tax credits or indeed can you do both?

Richard Pelan: Yeah absolutely. There was an issue before where the SME scheme was very attractive and it competed with our grant for R&D scheme. To be honest it was-, it was really up to companies. There was-, there was not a lot of difference between the R&D tax credits and our grant for R&D scheme. At that stage you couldn't do the SME scheme and you couldn't do our grant for R&D scheme at the same time because they're both notified state aids. So, it was either or and but from April this year the R&D tax credits have changed so the rate of support for the small company scheme has dropped off but what it means, the large company scheme which is not a notified state aid, the rate of support has increased on that there so it's now actually probably beneficial to look at the grant for R&D as your notified state aid and then supporting the same costs using the large company scheme support and then whenever you look at that it is actually much more beneficial than it was previously to do the both together. And much more beneficial look at the grant for R&D plus the large company scheme, the RDEC scheme rather than just doing the, the small company scheme. But if-, it's, it's still there, there's still a, a, a fair bit of work to do in that and understand to know what is the right fit for you and I, I mean, I'm more than happy to help as far as possible help you understand that but I'm by no means an expert in that area. So, I advise to either talk to your accountant or an R&D tax credit specialist but certainly with the changes in the R&D tax credits it is now really beneficial to look at doing an R&D project and then use-, supporting at same costs with the large company scheme in combination with that.

Melanie Dawson: That's great thank you. So, maybe go back to Daniel then. I suppose just a quick one, hopefully an easy one but do businesses need an in-house energy or sustainability expert to work with your team to have those conversations or what, what do those conversations normally look like between the organisations and yourselves?

Daniel Purdy: Yeah that's totally dependent on the business. Some businesses are, you know, they may have that ability to have a resource there, you know, that will function on it or, or focus on energy. We hopefully provide the expertise, all we really need is an engaging person within the business, you know, and I assume it's the same for, for Richard and John that they, sort of, provide the expertise, you know, so if there's somebody there that willing to engage to provide, you know, the site visit that's needed or to be there for the, the, the site visit to provide the relevant data to either ourselves or to the consultants, you know, we hopefully take the, the other pain out of it, you know. We appreciate that businesses, they're experts in making widgets or whatever their product or service is, you know, we don't expect them to be experts in energy in our case, you know, so hopefully we can-, we can be the people that step in and, and, and, and take that pain away from them so, you know, just be willing to engage with us and I'm assuming if you have contacted us, you know, you see the importance of it so you, you, you should be willing to engage, yeah.

Melanie Dawson: That's great thank you. And then just a final one for John then. So, John in terms of the operational excellence pace, so if one of the companies in the room here today were to engage with you and to start this process what does that actually look like? Is there a lot of paperwork to fill in or can you walk us through what the journey would look like and indeed the time commitment from the organisation to be able to secure the support from, from your team?

John McClune: No, we, we, we try to make it as painless as possible. There's no real paperwork involved, all you do is you contact us and we'll come out and visit you and what we try to do typically is understand your business understand the issues, I mean, you, you probably think back, back to base you probably have bottlenecks, you probably have constraints to the business, you probably have recurring issues that you need to address and it's really about scoping out where do we start and then we, we have-, I have a team of ten. I like to say we used to have real jobs once, you know, we, we, we did work out in industry so we, we understand, you know, some of the, the pressures that you, you folks are under. So, it's all about trying to, to tailor the support to meet your, your needs, needs and requirements, you know. If you-, if you-, if you want to start out, quite a lot of companies what we'll do is we'll, we'll help them out by that customer to cash loop and then once you've got that, well where are the bottlenecks? Where are the real issues? Where are the things that are really biting you in the behind? And once we have those well then we start. Let's, let's get a, a team together, we'll train the team up and then we will coach and mentor them through that team to address your issues and to drive some value-added benefit to the business.

Melanie Dawson: Thank you that's great. So, I'm going to open it up to the audience now so if you have any questions for any of the three on the stage you want to put your hand up we'll get a microphone down to you.

Clive Stewart: Sorry am I not allowed to ask a question? Sorry, Clive Stewart. One for John, John is there a charge to engage the operational excellence team?

John McClune: No, no there, there's no charge. The, the only cost to your business will be the time that you invest in it, but to give you an indication, we had an independent evaluation, so it says our return on investment is seventeen to one. So, if you think about that, for every one hour that you guys spend improving things you're going to get-, you're going to get seventeen hours back. So, it gives you the, sort of, an idea of the, the scale of it, but there's no charge other, other than the cost with your time.

Melanie Dawson: Thank you. Any other questions? Liam?

Liam: It's, it's not really a question, Melanie, it's more of a, I suppose, a personal experience. We launched SustainIQ back in 2018, and Invest NI have been a big supporter of the business since, since we launched. So, even as we developed the tech, we, we sat down with our client rep and we were able to then access TDI funding to help us with those project-, that, those project works, and Invest NI would provide support up to a certain percentage of the development costs, and then as the business grew we also benefited from, you know, we were bringing new roles and recruiting new people into the business. Again, Invest were able to support us with that scale up. And then, most recently, I just got back last night from the Netherlands where we took part in the Invest NI Going Dutch program. We've got Dutch clients already, and we're interested in scaling up, but, again, speaking with Invest, we recognised that actually it's not so much us out there, it's more to do with partnering. So, Invest took us out and introduced us to a number of Dutch partners so that we could work through them. They know the market, they, they speak the language, so it makes sense. So, it's been a very successful trip. So, yeah, just wanted to share my

own-, my own experience and the support that, that these guys provide companies like ourselves. So, I would just encourage anyone there to definitely reach out and, and make inquiries.

Melanie Dawson: Thank you Liam, that's great. So we have any more questions? I'm gonna ask just one quick one and again I'm sure there's a few people in the audience wondering this one but we've talked about Invest NI clients and non Invest NI clients, how do you-, if you're-, if you're not a client how do you become one, because it sounds like there's different avenues open depending if you are or you aren't one so how do you go from being not an Invest, Invest NI client to being one? Any of the three of? I know that I've blind sided you with that one but I think there'll be people here who are not clients and we do have non clients in the room.

John McClune: Just, just testing my knowledge now of the-, of the process Melanie. I was going to say there's, there's Ethna, probably a bit better place in terms of some of the criteria and how to go about inquiring.

Ethna McNamee: Yeah so my name is Ethna McNamee and I'm the regional manager for Invest Northern Ireland based here in the West. So, just to become an Invest NI client for someone who is interested generally the first port of call would be through Stephen's team and the business support team. So, we have a free phone number that Stephen's team will filter but traditionally what, what we are looking for our businesses who are either actively exporting or interested in exporting. At the moment I suppose we're looking for companies who are, have I suppose up to £250,000 worth which is, kind of, early stage exporting companies interested in creating wealth and creating employment in the region and it's very simply a phone call to the business support team that will be filtered through to the regional teams who pick up in all sectors and if you're significantly bigger than that then there's a chance that we will refer that, that recommendation or that interest in through to our sector team which Gina, I'm sure you're aware of is here today. So, it's a seamless process for someone who's inquiring. We have a new competition called ambition to grow for someone who's coming to invest in Northern Ireland for the first time and who is of a smaller scale but we can take any of those inquiries through the regional office, either through our competition process or directly, whatever. So, very happy to get any new inquiries and feed them through the appropriate route whatever that is, thank you.

Melanie Dawson: That's brilliant thank you, Ethna, that's been great. So, to, kind of, close things off then I'm going to invite Gina up, Gina from Invest NI just to sum up and wrap up today's proceedings.

Gina Lyttle: Afternoon everyone we've had quite a action-packed morning full of tremendous presentations. I'd really like to thank our, our speakers Kevin, Lorraine, Liam, Chris, really appreciate your time and sharing your experiences and your expertise and hopefully we've learned a lot from that today. Covered a lot of various subjects, digital, productivity, innovation, sustainability and I think they're, they're all inextricably linked and that's been referenced several times this morning. I'd like to thank the events team and Natasha for all their work and setting everything up today for us, everything's

ran smoothly and I'm very grateful. Huge thank you to Melanie for facilitating today, Melanie works developing digital and productivity capability with a vast number of construction companies across Northern Ireland and we're very, very lucky to have her on the board. What I would-, I would encourage everyone-, there's lots, lots of subjects, references that it can be daunting, overwhelming. I would encourage you all to think where you are, where you would like to get to and how can the Invest NI team help. The guys here have given an indication of the areas that they could be supportive but we're, we're here, we're willing to work with companies and we want to increase the tremendous capability that NIPLC has to offer. There should be an evaluation form on your tables and I would really be delighted if you could complete that for us before we move next door. So, take the opportunity-, please enjoy, we've, we've lunch coming up next door. There's an opportunity to network, to mingle with the Invest NI people, all our exhibitors. So, enjoy the rest of the morning, I, I appreciate your participation and engagement and thoroughly enjoyed the Q&A sessions that we had. I think it's valuable we've got a rich amount of expertise in, in the room and, you know, that, that's clear that there's a passion for the areas that we've covered this morning and let's see how we can help you on your journey. So, thank you very much, please enjoy lunch and we're around for any questions that you might have. Thank you.

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