

An aerial photograph of a red semi-truck with a long trailer driving on a two-lane asphalt road that cuts through a dense, lush green forest. The truck is positioned in the center of the road, moving away from the viewer. The road has white dashed lines for lane markings. The forest is vibrant green, suggesting a healthy, mature woodland.

PAM

SAINT-GOBAIN

Supply Chain Collaboration. Is it Helping Drive Down Carbon in Infrastructure Projects?

The thoughts and findings from interviews with key stakeholders from different levels of the supply chain.

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INTRODUCTION



Alan Gwilliam
Managing Director
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We are already seeing the effects of climate change on an almost daily basis. There is a real sense of urgency when constructing new infrastructure projects to work together to reduce our greenhouse gas emissions. Supply chain collaboration is vital as we drive towards our net zero targets. While the desire is there, how well are we working together as an industry towards this shared goal?

To find out we have conducted a series of in-depth interviews with key stakeholders throughout the supply chain, including end customers, tier 1 contractors, manufacturers, merchants, and sustainability consultants. This paper explores their thoughts on what the industry is doing well and where we can collectively improve.

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CHAPTER 1

BACKGROUND

The UK government has introduced legislation to reduce our greenhouse gas emissions from 1990 levels by at least 100% by 2050. This includes intermediate targets of reducing carbon emissions by 68% by 2030 and 78% by 2037.

The government's guidance note Promoting Net Zero Carbon and Sustainability in Construction states: "UK construction activity accounts for around 50 million tonnes of CO₂e emissions, over half of which is linked to construction product and material production."

It then calls for contracting authorities to "have a responsibility to act now to reduce these emissions. They should have strategies in place to achieve net zero carbon in relation to construction and operational emissions across their estates and other built assets by 2050, as part of a Strategic Asset Management Plan."

And to:

"[...] take a whole life approach to mitigating carbon, and ensure due consideration is given to issues such as waste and recycling, sustainable sourcing of products and materials, and the objective of developing a circular economy."

In response, regulated sectors such as water, highways and telecoms are all responding and working with their supply chains to improve their sustainability performance.

WHY IS THE SUPPLY CHAIN IMPORTANT?

With product and material production accounting for more than half of the 50 million tonnes of CO₂e emissions, working with and understanding the supply chain is critical to any future success in achieving meaningful carbon reductions.

In an industry that has traditionally sought best value solutions in monetary terms, whether for the initial investment or over the lifecycle of an asset, we ask how this change in mindset is working in practice and whether this drive to reduce carbon is working its way down the supply chain.

Government carbon reduction targets correct as of September 2024.

CHAPTER 2

HOW IMPORTANT IS SUSTAINABILITY IN CONTRACTS?

For regulated industries, sustainability seems to be very important. For public sector work any organisation bidding on a contract exceeding £5 million must have a carbon reduction strategy.

According to Alexander Herridge, Carbon and Sustainability Manager for Anglian Water, there is a realisation that reducing carbon can reduce costs: “It’s getting better, the conversation has certainly moved on from where we were five years ago. There is a realisation that reducing carbon can reduce costs but there is not much maturity in how this is contracted for.”

Joshua Harding, Carbon Manager at Severn Trent agrees, adding: “Reducing carbon is very important and there is a lot of attention on scope 1 and 2 emissions,” but he cautions “scope 3 has less commitment at the moment although we do have supply chain teams looking at that. Scope 3 has been a bit under the radar, but it is vital for us to hit our carbon reduction targets.”

For local authorities, Paula ClaytonSmith, CEO of the Local Council Road Innovation Group, reports progress has been made over the last five years and sustainability is more of a mainstream topic. While some local authorities have managed to understand the link between corporate aspirations and operational level, she reports that it is a bit of a mixed picture across different councils.

The tier one contractors that we spoke to also share this view that sustainability is becoming increasingly important in contracts. Dan Ulanowsky, Low Carbon Manager at Galliford Try commented: “We are working with our supply chain to ensure sustainability and low carbon are appropriately factored into contracts, but we are mindful that cost implications have to be considered. The utopia is you can achieve carbon savings without increasing costs but, in reality, this isn’t always possible. Our PAS 2080 certification, which we are targeting as a group by 2025, will mean that we have to present lower carbon options even if our client has not asked for them.”

Anthony Fernihough, Associate Director at AtkinsRéalis agrees that contracting parties need to be aware of change: “One problem has been some experienced engineers who have always done it this way, who are then teaching younger engineers the same methodology. In the past, we have seen some universities teaching practices that are from 10 to 15 years ago. Industry has moved on, and, in fairness, we are starting to move beyond that now with people more willing to take on new ideas.”

Taking a more holistic view, Ian Heptonstall, Director at the Supply Chain School, emphasises the importance of public procurement notices that are “publicly available and show within the bidding that there is a weighting for carbon reduction and how this is balanced with price.” He argues that contractors and manufacturers need to be “in the same room” so they can be aware of innovation and what is changing.

IN SUMMARY

While scope 1 and 2 carbon measurements are generally well accounted for, there seems to be a general acceptance that there is a need to address scope 3. And it is here that a lot of future progress must be made and where engagement with the supply chain is essential.

Sustainability is now high on the agenda, but our respondents agree that value for money remains dominant. While sustainability is a vital part of the contract, some gaps still need filling, most noticeably awareness of scope 3 emissions which must involve greater co-operation with the supply chain.

Scope emissions

Scope 1

Direct emissions from company-owned and controlled resources.

Scope 2

Indirect emissions from the generation of purchased energy.

Scope 3

Emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.



CHAPTER 3

WHEN SHOULD THE SUPPLY CHAIN BE INVOLVED?

The Construction Playbook urges: “Early supply chain involvement [...]” for “[...] identifying opportunity and mitigating risk early and accessing the industry experts’ knowledge and experience in all tiers of the supply chain [...]”

It later states: “Engagement with the supply chain, including designers, contractors, specialist contractors and product suppliers, should inform the development of the business case for projects and programmes. Involving the supply chain early in the project lifecycle will promote effective collaboration, reduce downstream issues and help to develop clear, outcome-focused designs and specifications.”

Recognising that scope 3 is where most of the potential carbon reduction will come from, we asked our respondents exactly when they believed the supply chain should get involved in infrastructure projects.

Ian Heptonstall from the Supply Chain School believes that the supply chain should be involved well before projects start. He states: “If they are only involved on a project-by-project basis then it won’t be effective. A customer may also ask for something that is not available or, conversely, they may not be aware of what is available.

“If the supply chain gets involved in early discussions, they can showcase innovation and discuss what is changing to bring their expertise to the table”

Alexander Herridge from Anglian Water agrees they need to be involved “as early as possible ...” and that the communication flow needs to be better stating it “works both ways, our decisions can constrain the supply chain but equally if we get the information in earlier then we can incorporate efficiencies and carbon savings early on in the design phase.”

While Paula ClaytonSmith from LCRIG agrees, she states that her experience with local councils is that some are cautious, stating: “Councils don’t want to speak to suppliers

too early and give the impression that they've secured the work. It's also vital the procurement process does not get in the way and that there are always ways of having constructive conversations," pointing to the vital work that trade associations do in putting on "non-threatening" events to bring different supply tiers together.

TIER 1 CONTRACTORS' ROLE

While the main contractors are often involved from the beginning of a project, frequently developing the design, this engagement does not always filter down to the sub-contractors and product manufacturers further down the supply chain.

This is something that needs addressing according to Anthony Fernihough from AtkinsRéalis who says: "We need more understanding from the supply chain about the carbon cost of their products and what they have done to reduce this cost. They can also input on what is best installation practice so that we fully understand the whole picture. With pipework, for example, we also need to look at reducing bedding material as a factor."

Josh Harding from Severn Trent sees a close liaison with the main contractors who often complete the design but acknowledges that there is sometimes a communication gap to lower tiers: "With the contracted designer, who are often tier 1 mandated to achieve CO2e reductions, it's often left to tier 1 to engage with tier 2 and 3 suppliers."

“ If the supply chain gets **involved in early discussions** they can **showcase innovation** and discuss what is changing to **bring their expertise to the table.** ”

While realising that early engagement will deliver innovation and cost savings, Sue Giffard, Supply Chain Manager at contractor Galliford Try, also states that this is an opportunity to look at other factors such as its effect on sustainability and carbon reduction.

Her colleague, Dan Ulanowsky, Low Carbon Manager, adds: "It's about early engagement to maximise opportunities to reduce carbon. When conversations happen during the design phase, the price is generally fixed. Ideally, carbon targets and reduction opportunities are discussed during optioneering, when a client's willingness to pay for lower carbon products and solutions can be assessed before the price is agreed.

"While they may not be willing to pay such a premium, we can still explore other steps and options."

MANUFACTURERS' EXPERIENCE

But what is the experience of manufacturers delivering many of the products and solutions for infrastructure projects?

According to Alan Gwilliam, Managing Director at Saint-Gobain PAM UK, there needs to be better communication and understanding of a project's requirements right down the supply chain: "Clients who manage the infrastructure network understand the need to explore different options. Encouragingly, we are now seeing contractors wanting to understand how we can contribute to their carbon reduction goals.

"Having said that, if contractors or end customers came to us for help before a project, we can work with them to solve issues. At the moment it's more us pushing ideas than them being pulled up through the supply chain. The challenge for us is how can we work

more collaboratively with both contractors and the client.”

Dalton Marshall, Business Manager at Rosehill Polymers agrees, saying it's better to be involved early on: “If the goal is to reduce CO₂e, then it's better to be involved early as we can design specific products for them by working closely with their engineers. For example, by exploring new materials. However, we tend not to be involved in the first stage, but between secondary to detailed design.

“As a large SME, our components tend to be part of a wider system, so we need to be realistic. It comes down to how much value we can add at that stage.”

COULD MERCHANTS ACT AS A LINK?

Megan Adlen, Group Sustainability Director at Travis Perkins plc believes that merchants can help unlock some of the innovation and products from manufacturers: “We can act as a link between clients and tier 1 contractors and manufacturers. In my opinion, the supply chain should be involved before projects even begin. While, historically, that has not been the role of merchants, we are exploring options. I believe we can play a vital role in unlocking the supply chain and opening up communication.”

“ There is widespread acknowledgement that **communication needs to improve throughout the supply chain** if the industry is serious about tackling its scope 3 emissions. ”

SOME FINAL THOUGHTS

From our research, there is widespread acknowledgement that communication needs to improve throughout the supply chain if the industry is serious about tackling its scope 3 emissions. And, as we have highlighted, this is vital if we are to meet future carbon targets.

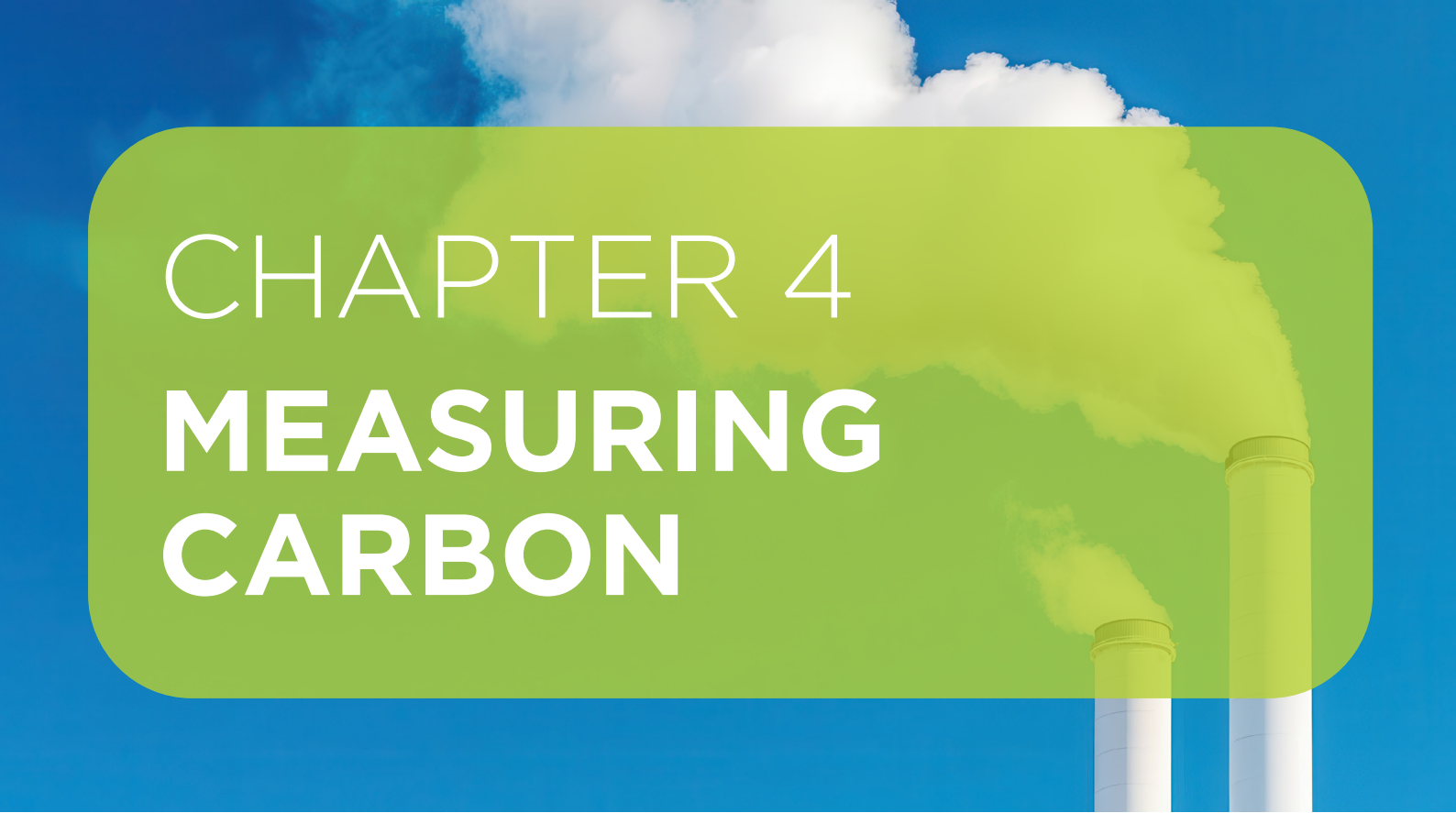
On the bright side, the conversations are starting to happen and there is a real sense of motivation to move towards more collaborative engagement that goes beyond simple transactions. But it could be better and there is a need for earlier engagement with manufacturers of products who account for much of the scope 3 emissions. Most participants agree that engagement needs to happen before a project starts.

A key question is: How do clients and contractors assess the carbon reduction offered by different products and solutions? How is it measured? Is it consistent and how do we overcome greenwashing? Our respondents share their views in the next chapter.

“ There is a need for earlier engagement **with manufacturers** of products who account for much of the scope 3 emissions. ”

CHAPTER 4

MEASURING CARBON



To reduce the carbon on a project we must understand how much we use and how to reduce this. Consistent measurement of the carbon impact of products, materials, delivery and installation is essential.

The problem is that different manufacturers often have different methodologies, and some SMEs may not have any systems in place for reporting – due to the cost and administration of doing so.

Emma Pye, from PYE Management sees this as a big issue: “We need to consider both the methodology and the total cost of carbon from raw material right through to end of life for a product, so the total carbon cost not just its installation cost. In an ideal world, we would do a life cycle carbon analysis, but there is nothing like this available at the moment that is simple to use, and it can be very complex.

“In practice, there is too much short-term thinking but this is changing, and we are getting more mature for both cost and carbon usage in terms of spending well now to save in the future.”

Heptonstall from the Supply Chain School argues that we need to put a price on carbon and at the moment the price per tonne of carbon is too cheap: “The price of carbon is too cheap and this means it is often cheaper to offset carbon than to reduce it in the first place.”

Harding from Severn Trent argues that carbon needs measuring at several points of a project from optioneering to aid decision making and then again at outline and detailed design phases before looking at the final solution: “We generally use carbon calculators and look closely at products and installation and set reduction targets for each stage. At the moment this just covers embedded carbon, but we do take operational carbon into account and look at the expected lifetime of an installation to give a total carbon number.”

Anglian Water has its own in-house calculator to ensure consistency and accuracy but says Herridge: “While we try and model carbon usage at an asset level for the life cycle of a project, there is always a worry that we are devaluing carbon.”

On site, the reality can be very different according to Fernihough: “In truth, carbon is

often badly measured and based on rough estimates. Carbon accounting is very tricky and it's hard to get an accurate figure especially when there are variations on site. The earlier you start, the better the carbon costing will be.”

Dan Ulanowsky agrees, saying: “Scope 3 carbon data and reporting is a challenge. Often the products and materials used on a project are purchased by our sub-contractors, so we currently have limited visibility on this and have to use spend-based approaches to account for this carbon. This is in contrast to our direct purchases where we can apply specific carbon emission factors. It's an area that we are looking to improve by including carbon reporting requirements when we appoint our sub-contractors and by using digital tools to capture actual materials and product deliveries at a site level.

“At the moment there is no standard carbon assessment tool or common reporting standard across the industry which can mean that you have multiple, bespoke approaches across frameworks, which is inefficient. Where possible we are engaging our clients so that we can harmonise our approach ready for the increased carbon requirements of AMP8.”

Gwilliam added: “Despite the number of different tools and calculators used, they all help us understand that everything we do has a carbon impact: However, data is more accurate when a manufacturer can supply it, but SMEs can struggle with this so we still need indices such as those published by Bath University to remove this extra burden.”

According to Adlen, merchants will play an increasingly important role in measuring carbon in the future: “We sell to both big framework contractors and sub-contractors and we can help them with the data that they need. If they ask us for a bill of materials, we can put a CO₂e figure against the product or materials we supply. We can either base this on a manufacturer's EPD or apply what we believe the emissions factor is, based on a database.

“Because we source from thousands of manufacturers, we're well placed to support this flow of data and can help with any challenges. I'd also argue that we are neutral so we can give an agnostic point of view. We see this as a big opportunity and are working hard to improve this capability.

“One of the biggest problems is making sure we compare like for like. Even when manufacturers have EPDs, these can vary according to what they are reporting on.”

ARE EPDs THE ANSWER?

What is an EPD?

An Environmental Product Declaration (EPD) measures the environmental impact of a product. A manufacturer generates it using data obtained through a life cycle assessment (LCA). This LCA is completed using a peer-reviewed Product Category Rules document (PCR).



Any carbon measurement is only as accurate as the data available and the data for scope 3 is more accurate if it comes from the manufacturer.

Environmental product declarations (EPDs) are a way that manufacturers can supply validated data based on product category rules (PCR).

The question, according to Pye, “is how far does the PCR go? Is it just for A1 to A3 for the manufacture of the product? What about the carbon cost of transport and its installation? EPDs are becoming more trustworthy but they still need some work to be really useful.”

Heptonstall sees EPDs becoming far more commonplace, especially for standard products. He points to how they are used in other countries: “In France, 2,800 products received EPDs last year compared to just 235 in the UK. And the USA now has an EPD requirement for federal work in the Carbon Reduction Act. At some point, we just need to commit.”

He goes on to say: “ISO 14001 on its own is not fit for purpose. A pathway for carbon reduction should be built into the standard along with a need to report on it.”

Herridge thinks that EPDs have a big role to play but they need to be properly managed to be useful: “We need to understand what good looks like and I have seen some bad EPDs. They need to provide fair comparisons and we should codify what is included. We need better systems to integrate them.”

While EPDs are good at supplying validated data, they do have their problems as Ulanowsky explains: “While there are LCA standards that should drive consistency in what suppliers publish in their EPDs, it can be challenging getting comparable data for a given product from different suppliers, especially when not all suppliers have published EPDs for their products.

“Also, due to the cost and time it takes for suppliers to produce EPDs, there can be a lag between what the published EPD states and the actual environmental impact of the product supplied. If, for example, a manufacturer has decarbonised their production process in one year this won’t be factored into the EPD carbon value until they update it.

““ We need to **understand what good looks like** and I have seen some bad EPDs. They need to **provide fair comparisons** and we should **codify what is included**. We need better systems to integrate them. ””

Sue Giffard points out that EPDs can exclude SMEs: “Smaller companies and local supply chains may not have the resources and expertise to complete an EPD. We don’t want to alienate them so they feel unable to work with us.

“Our strategy is to work with and help SMEs to provide an appropriate level of carbon information for their products and services. For example, we hold regional net zero partner events to understand our suppliers’ challenges and work with them to resolve these.”

Agreeing with this sentiment, Heptonstall points to the USA who “invested \$200m to help companies get EPDs.”

BETTER STANDARDISATION

Daniel Camm, Group Environment Manager at Wolseley, points to the need for standardisation: “In principle they are great, but they are not all the same or comparable. Without training you may not realise what you are looking at and they can be hard to compare.”

Agreeing with this sentiment, Adlen adds: “When manufacturers produce the same product, they need to agree on what they report and not gamify the results. We need to be aware that EPDs could also stifle innovation and competition due to cost and complexity for new entrants, so there’s lots to consider.”

MANUFACTURERS' VIEWPOINT

But what about the manufacturers who supply the data?

Gwilliam argues that EPDs need verifying by an independent third party to ensure that the data is correct and there is evidence to back up claims: “We need a strict assessment of everything involved to collect the data and report it. At Saint-Gobain PAM, we have the resources and capability to do it, but I do understand that some SMEs may struggle with the extra commitment. However, in some sectors it’s becoming a requirement so there’s no option.”

While agreeing that EPDs are beneficial, Marshall highlights that the process of calculating CO₂e is open to interpretation which can lead to warped figures: “It’s not a level playing field, it depends on what you report and even some experts disagree. As an SME, we don’t know the best way to calculate it. We want to be honest and avoid greenwashing, but we could be at a disadvantage if we choose the wrong method now or in the future. What we really need are ISO standards for testing methodology and how to report the data.”

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MEASUREMENT AND THE NEED FOR CONSISTENT METHODOLOGY AND THIRD-PARTY VERIFICATION

There is no consistency on how to best measure and price carbon. Most agree that the cost of carbon is too low. Given that most future infrastructure projects’ carbon reduction is likely to come from the supply chain on scope 3 emissions, collecting and reporting data from products and materials is a major challenge for the future.

While EPDs provide an answer, even these are fraught with difficulty. There needs to be a clear and consistent methodology that is the same for comparable products and this data needs to be verified by independent assessors. There also needs to be a clear means of updating an EPD when a manufacturer reduces the carbon cost of a product or its installation or increases its life cycle.

While EPDs place extra time and cost burdens on manufacturers, particularly SMEs, they’re an answer if there is a clear and consistent methodology applied. They need improving, but, as an industry, they provide an answer.

Our respondents have mixed feelings on whether EPDs should become compulsory for projects. However, in many sectors, they are becoming a reality whether we like them or not.



CHAPTER 5

MANAGING INNOVATION

While the measurement of carbon is not perfect, the construction industry knows that it is vital so that we can quantify improvements going forward. Much of this future improvement will come from scope 3 emissions and the supply chain.

As Pye explains: “Innovation is crucial to drive carbon down, but we do need the methodology to see how much it is saving. It’s not just savings from manufacturing but also for the installation and understanding how the carbon saving claim happens.”

Heptonstall refers to an earlier point and the need to “understand how to design carbon out of projects, know where the blocks are and then use innovation to tackle those.” He argues for the need to measure on exemplar projects as “it can’t be done on every project because there is often too much cost and complexity, but there are some obvious areas where we can save carbon.”

ClaytonSmith suggests that there needs to be a change in attitude: “It’s not about formal processes but culture and curiosity to explore new things. While standards are important there is a danger that people get hamstrung by them. We need to be brave and work in partnership with suppliers, it’s not just about transactions.”

Harding adds: “It’s about curiosity and making the time to understand what products and solutions are available by going to expos and conferences for a chance to meet and talk to suppliers.”

Herridge points out that innovation needs to be challenge-led: “Operating within a long-established alliance gives Anglian Water and @one Alliance (a scheme where we work with key delivery partners for ongoing improvement) a longer-term view of innovation.

“We have grouped innovation, carbon and standard products into one team. It allows us to identify carbon hotspots for the innovation team who engage with the market for solutions. These are then passed on to the standards team. This is a more rigorous approach than hit and miss trialling different solutions.”

Managing innovation can be very hard in practice according to Fernihough: “It can come from lots of places, both within our industry and from elsewhere. It’s generally not well managed in reality. Caution can get in the way as there is often an inherent risk with changing something. Also, tight timescales and programmes do not give enough time for proper innovation.

“We need more time to consider options, particularly at the early concept stage. And we need to spread the innovation net wider. Involving contractors early is great but be careful that they don’t stifle innovation due to their preferred methodology. We should be talking to manufacturers further down the supply chain all the time, especially for key products or areas that use a lot of carbon and we need to go outside the industry to fund research and academia to establish if there are better ways to achieve our goals.”

Gwilliam states innovation often goes beyond the product: “A lot of our innovation involves working with contractors and end customers on the solution or process. If we can improve the installation, it will need less repair and maintenance so we can reduce its lifetime CO₂e. We also need to consider how we can collectively use more recycled material, not only in our product but also recycled aggregate in the installation to help reduce the carbon footprint? It’s very much systems-led.

“ Innovation often goes beyond the product ”

“Most of the drivers for process improvement are still cost savings but they can save carbon as well. Clients managing the network understand the need to explore new options, but more contractors want to understand this as well. What we really need is better communication and understanding right down the supply chain.”

There needs to be a willingness to explore change by all those involved according to Marshall: “We need open pragmatic conversations with both customers and policymakers. We sometimes find that customers are setting specifications based on predated standards and materials and this can limit innovation.”

Adlen believes merchants can help unlock the supply chain to bring new products and materials through: “Travis Perkins plc is exploring how it can accelerate innovation through merchants.”

“ We need **open pragmatic conversations** with both customers and policymakers. We sometimes find that customers are **setting specifications based on predated standards** and materials and this can **limit innovation.** ”

CHAPTER 6

THE CIRCULAR ECONOMY

Overall, our respondents can see the desire to use innovation to drive down carbon, but there is a need for better and more open conversations both upstream and downstream.

While the industry is focussing on embedded carbon, Pye says there is a danger that this does not translate into long-term savings if we do not consider future reuse, repurposing and recycling: “While we are creating low carbon products and solutions now, if we don’t consider its entire life cycle then we lose some of the benefit. A good example is if we use plastic pellets in roads then the material can’t be recycled and reused in an asphalt plant.

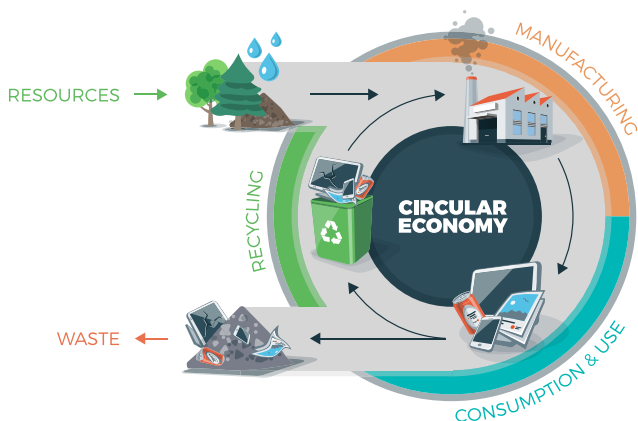
“We need sustainability experts in procurement to consider the whole life at the beginning of the process. Often, they are too far down the organisation to have a real influence.”

According to Heptonstall, for the circular economy to work, you must involve the supply chain: “We need to develop a model for repurposing, reusing or recycling products and materials. For example, offering take-back schemes for both your own and competitor’s products.

“And procurement needs to be involved to incentivise and help make it possible to use recycled materials and products.”

Adlen believes that merchants can play a crucial role in the future: “There is a need to remove built-in obsolescence. Products need to be more durable, have replacement parts and maintenance regimes, and be easier to reuse.

“Also why not plan for reverse logistics, so as well as delivering products and material, wholesalers could take away old products and waste and deliver them back into manufacturing or industry reuse and recycling centres? At the moment, merchants cannot



easily manage this because the law is complicated with waste transfer licences and storage space in the network is limited, so it is not an economical solution.”

Camm has seen more manufacturers think about replaceable parts over the last five years: “We see more manufacturers thinking about replacement of wearable parts rather than the whole product. For example, Grunfos will repurpose pumps and Polypipe will take used plastic and clean it, ship it and then reuse it for new pipe.”

According to Gwilliam, there is a real need for manufacturers to evolve and replace parts as well as products: “A lot of our pipe innovation involves swapping out wearable elements. If we can avoid digging our products out of the ground, then we are avoiding future emissions. We are doing lots of research into these areas at the moment.

“We also need to think about future needs such as heavier electric vehicles on roads and testing gaskets at installation.”

Marshall points out that while the circular economy is vital other priorities can take precedence: “We can’t negatively impact the safety of a system by optimising consumable part usage. Wearables and auxiliaries are simple to replace and will have an ongoing maintenance regime.

“In regulated markets, products will have a design life and are then decommissioned but most of the material is still usable and is often repurposed for other applications. A good example is timber railway sleepers that are used for retaining walls or even in someone’s garden.

“It’s worth talking to manufacturers about this. When our products come to the end of their original purpose, we suggest the next best steps and who to contact. It might be a dedicated company looking to reuse them for alternative purposes or a recycling centre.”

ClaytonSmith admits that, with a few exceptions, the circular economy is not massively spoken about in the highways sectors: “At the moment the culture of thinking is just not there yet and it’s more advanced in other construction areas.”

““ We need **sustainability experts in procurement** to consider the **whole life** at the beginning of the process. Often, they are **too far down** the organisation to **have a real influence.** ””

Harding adds: “There is a massive potential benefit in the water sector with the circular economy, but we need better mechanisms to calculate the end-of-life costs.”

Herridge also admits that the average design team may struggle with whole-life carbon investment at the moment, but it is something we are moving towards: “We need early involvement from everyone in the supply chain to make sure that we design something maintainable. It’s also where BIM could be useful in the future.”

According to Fernihough, the whole supply chain needs to integrate into the circular economy to avoid the whole thing falling apart: “The whole supply chain needs to be integrated into the circular economy. If they aren’t then the whole thing falls apart. Manufacturers also need to consider repairs to extend the life of a product, its reuse and recycling, not only at the end of life, but where possible by using recycled material themselves.”

Giffard suggests that we need to try and standardise solutions: “By standardising solutions such as water treatment plants, we can optimise assets rather than ripping

them out and starting again. We don't always need to rebuild something to make it more efficient."

Ulanowsky believes that projects need to move to whole-life carbon assessments and that PAS 2080 adoption will drive the industry in this direction: "EPDs do require carbon assessment through every stage, but as we've already discussed the lack of consistency makes it a problem to compare like for like."

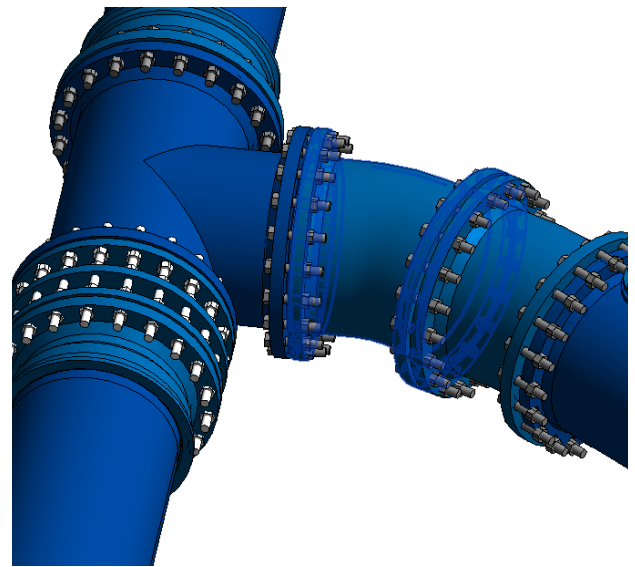
He emphasises that all parties need to be involved, adding: "Each part of the supply chain must focus on the bit that they can control and when you are reporting on the impact you need to be clear on the boundaries you report on. There needs to be a minimum level of carbon reporting to drive consistency. That's where standards

WHAT ABOUT BIM?

such as PAS 2080 and the updated RICs carbon reporting methodology will help drive consistency, but it will take time to be adopted and will need tier 1 contractors such as ourselves to support our supply chains with this."

When BIM (Building Information Modelling) first came into focus, the construction industry hailed it as a new way to ensure collaborative working with all parties sharing information throughout its life cycle. Although it is more common in buildings, it is used for some elements of infrastructure.

According to Heptonstall, the promise of BIM has not been realised: "It should record the carbon impact of a product, perhaps from an EPD, which would enable us to see how much



carbon is in a design compared to a redesign, but the data is not there."

Fernihough agrees, saying: "BIM can be good, and it can include carbon costs, but too often it is done just for the sake of it."

Both clients and the supply chain in the water sector are still maturing in their use of BIM according to Giffard, who states: "There is a need for greater collaboration in this important area to drive the full potential of BIM models and tools."

Harding sees a role for BIM in bringing carbon values into a design: "I can see BIM bringing carbon values into a design. We have an internal BIM team at Severn Trent, and they will help us make more informed decisions as we move forward."

Herridge continues: "In a perfect world, BIM would be a great sustainability tool. But we are still getting to a point where carbon is part of BIM software design, where it never used to be. We are finding that clients are generally further behind than design contractors. Within the @one Alliance partnership, we are also looking at other options such as generative AI design but that's in the early stages. In practice, we find that people still use PDFs and paper on site."

However, it is the manufacturers who need to populate BIM with the carbon information now that it is part of the system. So, do they see a future for this digital tool?

FINAL THOUGHTS

Gwilliam agrees that BIM will help avoid mistakes and offers a more efficient way of construction to incorporate different products: “BIM enables you to build a digital project first and avoid mistakes, so the environmental and productivity savings are potentially huge.”

Marshall also agrees it is a good technology to adopt, allowing “quick visualisation of the CO₂e on a project for both embedded carbon and for ongoing maintenance and the life of an asset.”

While there is a real understanding and desire to explore carbon throughout its lifetime and beyond as part of a circular economy, our respondents tend to agree that the methodology and understanding are not yet in place.

Manufacturers are designing more durable products and considering maintenance and replacement of wearable parts to prolong life. There is also a move to the reuse of products and recycling at the end of service life with products using more recycled material over virgin material.

“BIM enables you to **build a digital project** first and **avoid mistakes**, so the **environmental** and **productivity savings** are potentially huge.”

CHAPTER 7

IS TRANSPORT A BIG FACTOR IN CARBON REDUCTION?

In theory, BIM could be a big enabler in designing and understanding the cost of carbon through an asset's lifetime, but carbon costs have only just become part of the system. It also depends on the accuracy of the data, taking us back to the measurement of carbon discussed earlier in this paper.

While we have talked about the amount of carbon contained in products and how best to measure it, we have not considered the carbon cost of transport.

It's something that our respondents are aware of and are working towards mitigating its effects.

Herridge comments: "We have lots of regional transfer schemes at Anglian Water and, for most products, it's a minor part of the carbon cost, but there are exceptions such as for metal pipes."

Observing that it's a complex issue, Fernihough adds: "While at first sight local manufacture of products might be good instead of transporting it halfway round the world, there is always a question of scalability and balancing the manufacturing efficiency because building a factory can cost a lot of carbon. Also, do you build products where the raw material is or where the demand is? It's very hard to generalise."

Closer to home, it's an area that wholesalers unsurprisingly have given some thought to. Adlen points out that most people ask for the carbon in a product from its extraction and manufacturing or A1 to A3, but do not consider delivery and "we do have accurate data for this."

“Some fuel types can be an issue on site. Contractors vary in their attitude to HVO (hydrogenated vegetable oil) fuel. For example, some want it and some ban it. There is good and bad HVO, so there is a need to know that it is responsibly sourced. We also need to recognise that our delivery from merchant to site is just part of the story, because a factory could be at the opposite end of the world.”

“It’s messy but something that, as a wholesaler, we are working on and we need to remember that while transport carbon is important, it is not the biggest driver of lifetime carbon.”

Camm agrees that reporting on the carbon used in transport is complicated: “We use a lot of third-party logistics companies, and it can be very hard to report. Often, we are not involved in the delivery but arrange for a partner or manufacturer to pick it up and deliver to site. We are trying to cut out as much transport as possible through efficient logistics and how we can make our fleet more efficient by increasing the number of electric vehicles that we use.”

While transport is a hot topic for the public and how we can individually reduce our carbon footprint, it’s not the biggest priority for the construction industry at the moment.

Our respondents are aware of its role, especially those involved in logistics and delivery, but it can be hard to calculate. There are other factors to consider such as local production vs carbon efficiency of manufacturing and the cost of investing at scale to ensure carbon production efficiency rather than having lots of local but inefficient plants.



CHAPTER 8

DOES PROCUREMENT NEED TO CHANGE?

Procurement is a vital part of sourcing products and solutions, and procurement teams will often make the final decision on who they use from the supply chain. Owners of assets such as major infrastructure have a real understanding of the cost of ownership, so life cycle costing in monetary terms is generally well embedded.

The question is, with cost still the major factor for most projects, how well-trained are procurement specialists in making decisions around sustainability, particularly when it comes to driving down carbon as we move towards net zero?

According to Pye, it is an issue as we move forward: “Procurement needs upskilling. At the moment most procurement professionals don’t know what questions to ask about sustainability. When they do, then the supply chain can develop solutions to meet their needs.”

Heptonstall from the Supply Chain School agrees that “procurement professionals must change their thinking so that it is not based on what they believe is achievable but on the outcome of what they want. Why not for example encourage two bids? One to meet what they want and a second to explain what is available.



“Procurement needs upskilling”

“They certainly need training on carbon costing. If they don’t ask the right questions, they can’t make the right decisions. Fortunately, a standard ISO 20400 for sustainable procurement and training is available. A bigger task is to stimulate the market enough to make sustainability the right choice for both the environment and finance.”

Harding argues that sustainability needs to be understood at every level in the organisation, not just procurement, and there is still too much emphasis on cost.

Herridge believes that a more nuanced approach is realistic where everyone needs to know enough and then understand at what point they need to contact a specialist: “So, for example, what are the rules around the cost of decarbonisation? If it’s less than a certain amount then get on with the project, but if it is higher then it should go through a governance process. However, there needs to be some empowerment so the process remains efficient.

“We also need a proper carbon management system to track all of the opportunities and risks. While a low-carbon solution may be too expensive for one project, if it is packaged up across 20 then it may be more cost-effective. Knowledge management is vital if we are to learn lessons on an ongoing basis.”

As far as contractors are concerned Giffard can see that sustainability is becoming more prevalent in tenders: “Clients are becoming more aware, and sustainability is embedded more than it was a few years ago. It’s now part of a daily conversation and given greater prominence in tender requirements. As a result, we are rolling out carbon management training across the business to upskill our teams in all areas to support them having meaningful conversations both internally and with our supply chains.”

“ In the next **five to 10 years**, procurement will need to understand **carbon credits** and **carbon tax**. ”

There is still work to do as far as Fernihough is concerned: “It should be a KPI for both procurement teams and contractors. If contractors change the design, then what is the carbon cost of doing so? It’s better than it used to be, but it still needs improving.”

Camm agrees: “Training needs to be more widespread across an organisation to cover procurement teams and sales: For some, it is still too much of a tick box exercise, but others are much better, it depends on the project and the products available.”

Adlen also agrees, adding: “We have started training our procurement teams, but it comes back to measuring carbon and avoiding greenwashing. Also, some contractors and sub-contractors have other needs, so it needs to work right across the supply chain.”

MANUFACTURERS’ VIEWPOINT

But what about manufacturers who are often the focus of procurement on a project basis? According to Gwilliam, there is a lot of focus on this at the moment and legislation changes are developing the sustainability agenda: “Public procurement legislation is coming that focuses more on sustainable solutions. It’s already happened in Europe, where many countries must have sustainability as a key driver. It means that people have to justify their decisions. It’s moved on a lot over the last few years.”

Marshall states that more procurement team knowledge will be a huge benefit but sees progress: “In the next five to 10 years, procurement will need to understand carbon credits and carbon tax. Higher carbon use will come with higher costs. It would be good for procurement teams to get ahead of this. Some are asking questions, but it’s hard to know if this is still a tick box exercise.”

SUMMARY

There is a general agreement that procurement teams need to upskill to understand more about sustainability and that this needs to inform more of their decisions. Overall, it’s felt that such knowledge needs to reach beyond procurement to other teams involved in projects.

CHAPTER 9

THE ROLE OF LEGISLATION

We have witnessed a collective will across the supply chain to reduce carbon where possible. However, one of the problems is a lack of standardisation – on how and where to do it, on measurement and on reporting. So, we asked our respondents about the role of legislation.

While agreeing that legislation is important, ClaytonSmith highlights the uncertainty of how much legislation should be in place: “We’re not clear as a sector whether we need to set a bigger picture or go down to the nth degree. People can get caught up in the minutia, but sometimes we need that.”

Heptonstall believes the government should set the direction of travel and then let the industry get on with working out the answers: “They should set the targets and then stick to them, but they can’t work out the answers because they don’t have the knowledge.”

Harding states: “We need to centralise what we must achieve, and legislation is a good driver for change.”

“ We need to centralise what we must achieve, and **legislation is a good driver for change.** ”

A big issue, according to Herridge, is a general lack of urgency: “The carrots are not always working with people. Correctly applied policies work well, but they cannot be overly restrictive as they might exclude people or suppliers. There are some good examples of legislation driving change such as with the ozone hole. One very interesting area at the moment is the carbon border adjustment mechanism, or C BAM, which puts a charge on the carbon in products.”

Pointing out that the government has driven a lot of change in the last five years, Fernihough adds: “Sometimes you do need a lot of stick to change, but too much can stifle innovation as it brings in the risk of failure due to regulatory demand. The government needs to draw a fine line.”

Adlen also cautions that “it can become a common denominator and a bar that people drop down to achieve a minimum level of compliance. It is important, but so are incentives such as tax breaks.”

Camm argues that it is important “to lead and that the government has backtracked over the last year, which is not great and sends the wrong message.”

According to Gwilliam, legislation should create a common platform for everyone: “Legislation should create a common platform and reinforce what we all need to do. At the moment, much of what we do is not mandated through legislation.”


Striking the right balance and being able to change with circumstances is important for Marshall: “If legislation is agile and pragmatic and not a hindrance then it is a good thing. But, in practice, it has often done the opposite and weighed industry down with paperwork. Things have happened in the last five to 10 years that none of us would have predicted and we don’t want to lock things in when market forces could lead to innovation and solve problems. What we really need are open conversations with policymakers and customers.”

Generally, our respondents agree that legislation is needed to really drive change, but with the caveat that it should not stifle innovation. As Marshall points out, there is a need for agile and pragmatic legislation that can adapt to new circumstances. While the government cannot set out how to achieve carbon reduction, it can set in place targets and needs to work closely with industry to agree legislation and standards that will help achieve our common objective of moving towards net zero.



CHAPTER 10

CLIMATE RESILIENCE: ARE WE READY FOR THE NEEDS OF TODAY AND TOMORROW?



So far in this research, we have concentrated on how infrastructure projects can reduce carbon. Yet we are already facing the realities of climate change with extreme temperatures, droughts and flooding. Here we ask our respondents how they, and the supply chain, are responding to the realities of the new pressures being placed on existing and new infrastructure both now and for the future.

For Pye, this is a crucial question and consideration of the future is needed: “Management teams need to think about what the country will be like in 10, 20 or 30 years and ask whether their infrastructure will be able to cope. We need to think about longevity in climate resilience. For example, how will extreme weather affect our ability to cope and are the products we are installing able to deal with the high temperatures and more extreme flooding?”

“I believe that we need to have sustainability experts on board to help steer and make the right decisions.”

Heptonstall believes that there is a problem at the design stage: “Contractors have to build to a design. The supply chain should be involved from the beginning and educate clients about what they need. We need to get the suppliers and designers in the same room.”

“There are often answers to issues such as flooding and higher temperatures but too often suppliers are not being asked the right questions. This needs to happen before procurement so that it is not just a transactional process.”

“ The problem is that there tends to be a **reactive approach to resilience** because something happens. ”

According to ClaytonSmith, the industry needs to be less reactive: “The problem is that there tends to be a reactive approach to resilience because something happens. So, councils like Lancashire and Cumbria have learnt the lessons from the big storms that they have had and are working to design systems that will mitigate their effects. Drainage will become a big challenge with old systems not being able to cope in some areas.”

At Anglian Water resilience is very much coming to the forefront at a strategic level. However, according to Herridge, they recognise that they need to do more research: “We need to assess the effects of our current climate with more maturity and involve the supply chain. We need to think about ground movement and climate-vulnerable mains, for example, pipelines that are too close to the sea.”

Fernihough believes that climate change has been on the agenda for a long time, but it needs considering early in the design stages: “Despite climate change being on the agenda for a long time, it needs considering earlier. It might mean that we need to design something with a smaller lifespan so that in 30 years it can be replaced with something fit for purpose in the future. But we need to plan for that now. For example, have we left enough space allocation for that future need? We need to consider both current and future resilience with our designs.

“And it can be a complex thought process. For example, hot temperatures, droughts, and then large amounts of rain can cause ground movements and leaks in pipework, which will affect our long-term design approach.”

“ The attitude to **climate resilience** is very **intermittent** at the moment. Too often **planning for the future** becomes a **discussion piece** rather than **developing actual solutions**. ”

According to Gwilliam, manufacturers are solving the problems that face their products and solutions in infrastructure projects: “We are looking at our solutions and how we can work with other manufacturers to solve problems. A good example is exploring how well our grating products cope with higher volumes of water and then working with other manufacturers to use these with bigger gullies to hold more water. It’s not just about individual components but how well they work as part of an overall system.”

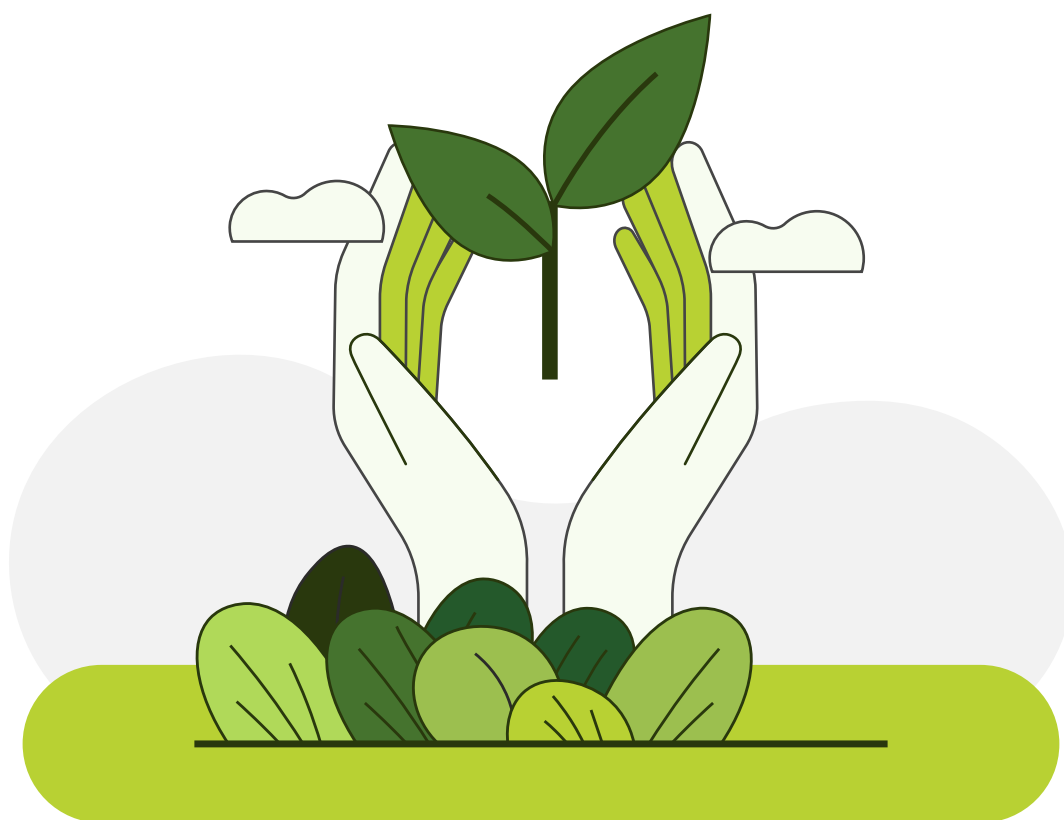
Marshall agrees that manufacturers are solving issues faced by today’s climate but thinks customers’ attitudes to climate resilience are very intermittent: “We design our systems to work in harsh environments and also focus on managing natural resources such as water in flash flooding events. We already look at the climate and what it will mean for our products and systems and how we can solve new engineering challenges.

“We find that when events happen because of climate change, customers will adapt, but this can be forgotten about when something else comes along. The attitude to climate

resilience is very intermittent at the moment. Too often planning for the future becomes a discussion piece rather than developing actual solutions.”

Our respondents believe there is a lot of awareness about climate resilience, especially in the face of extreme events over the last few years. However, there is a feeling that it only becomes a priority after there is an incident and, after action is taken, there is a danger that it is forgotten about.

At a strategic level, climate resilience is certainly on the agenda, but there is some doubt that this translates down to an operational level. While manufacturers are aware of how they can develop their products to mitigate extreme events and even work in partnership with other manufacturers to develop solutions, they need to be involved earlier in the design or even the optioneering phase of a project.





10 ACTION POINTS FOR INFRASTRUCTURE

Each of our respondents agrees that sustainability, particularly relating to carbon reduction, is high on everyone's agenda. Organisations that own and operate infrastructure are particularly keen and, in some cases, are mandated to reduce the carbon impact of their assets both during installation and over their lifetime.

There has been a real step change in conversations and attitudes surrounding carbon in the last five years as the impacts of climate change become more apparent. These conversations are happening at every level of the supply chain, but with scope 3 accounting for more than 50% of emissions, we were keen to see how well the supply chain collaborates to make a meaningful difference to ongoing reductions and, importantly, how we can all improve.

Our respondents are key stakeholders focused on carbon reduction within their organisations and represent different layers of the supply chain. Following detailed conversations with them, here are 10 recommendations that we believe will make a difference.

1. Give more weight to carbon reduction in contracts

Carbon reduction is far more important in construction than it was even five years ago. Value for money is still the key driver for most, however, and there is a feeling that too few are willing to pay a "green premium" for lower carbon solutions. There is of course a balance that we need to strike, but the feeling is that the carbon cost is still too low.

2. Involve the whole supply chain at optioneering

The supply chain accounts for more than half of all carbon emissions on a project. There is widespread acknowledgement that scope 3 emissions are where most future reductions will happen. Yet too often there is little visibility of what alternative solutions are available to cut carbon.

Communication needs to improve both upstream and downstream. Customers and contractors need to know what options are available before they design a solution or system. Manufacturers and merchants need to understand what clients need so that they can help solve issues, instead of providing what they think is needed.

3. Improve measurement of carbon

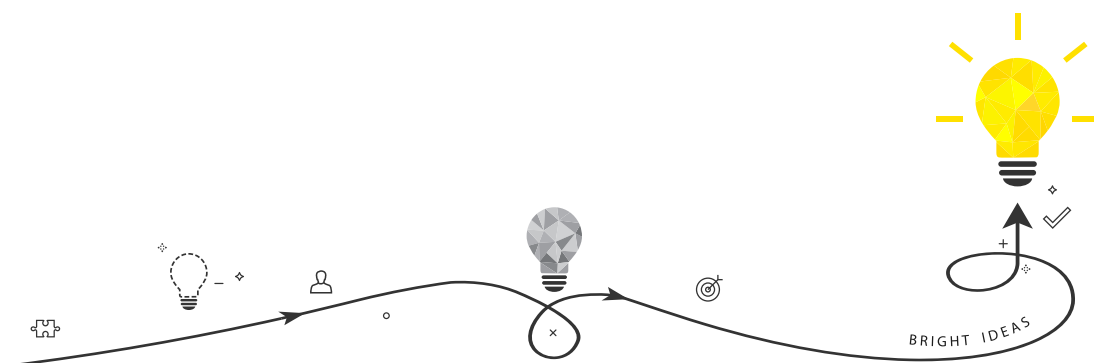
There is no consistency on how to best measure and price carbon. Most of our respondents agree that the cost of carbon is too low. Given that most future carbon reduction on infrastructure projects is likely to come from the supply chain on scope 3 emissions, collecting and reporting accurate and consistent data from products and materials is a major challenge for the future.

4. Improve methodology around Environmental Product Declarations (EPDs)

While EPDs provide an answer for carbon measurement of products, they are fraught with difficulty. There needs to be a clear and consistent methodology that is the same for comparable products and independent assessors need to verify this data. There also needs to be a simple and fast way to update an EPD when a manufacturer reduces the carbon cost of a product or its installation or increases its life cycle.

5. Better communication about innovation

Overall, our respondents can see the desire to use innovation to drive down carbon but there is a need for better and more open conversation both upstream and downstream. Customers and contractors need to understand what is new and, equally, manufacturers need to understand where the challenges are so that they can focus their future research and development.



6. Make the circular economy work

While there is a real understanding and desire to explore carbon throughout its lifetime and beyond as part of a circular economy, our respondents tend to agree that the methodology and understanding are not yet in place.

Manufacturers are designing more durable products and considering maintenance and replacement of wearable parts to prolong life. There is also a move to reuse and recycle products at the end of their life and use recycled material over virgin material.

7. Embrace technology to understand carbon

Technology such as BIM (Building Information Modelling) could be a big enabler in designing and understanding the cost of carbon through an asset's lifetime, but carbon costs have only just become part of the system. While people are starting to explore the potential role of AI in managing systems, there needs to be a standard approach to such technology before the industry can adopt it.

It also depends on the accuracy of the data as mentioned in action point 3.

8. Procurement and other teams need sustainability training

There is a general agreement that procurement teams need to upskill to understand more about sustainability and that this needs to inform more of their decisions. Such knowledge also needs to reach beyond procurement to other teams involved in projects.

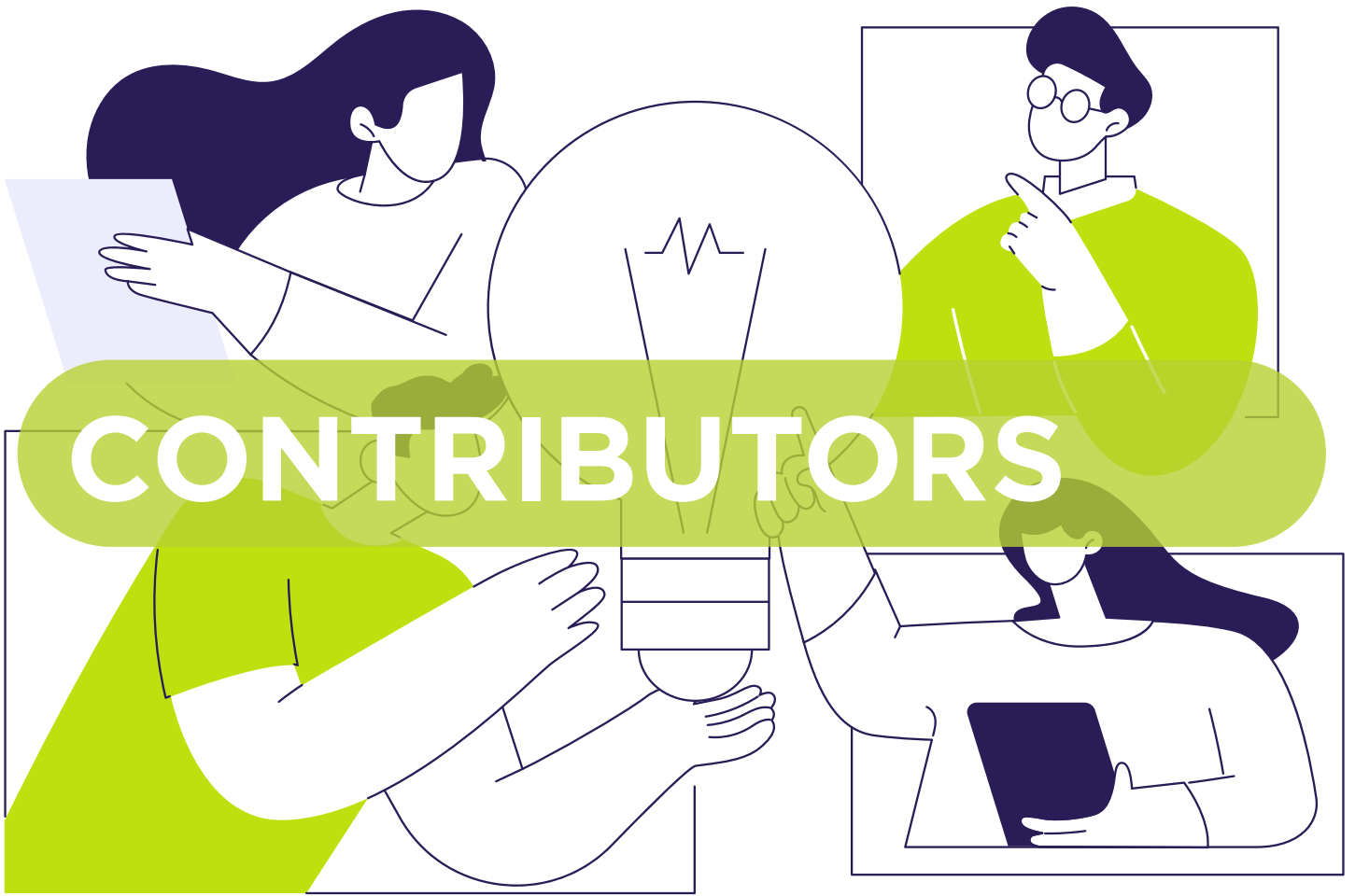
9. Agile legislation to set direction for change

Generally, our respondents agree that we need legislation to drive change, but with the caveat that it should not stifle innovation. There is a need for agile and pragmatic legislation that can adapt to new circumstances. While the government cannot set out how to achieve carbon reduction, it can set targets in place and work closely with industry to set legislation and standards that will help achieve our common objective of moving towards net zero.

10. Plan and implement solutions for climate resilience

While there is a lot of awareness about climate resilience especially in the face of extreme events over the last few years, it only becomes a priority when and where there is an incident. Organisations take action in these places, but then it is too often forgotten about.

At a strategic level, climate resilience is certainly on the agenda, but there is some doubt that this translates down to the operational level. Manufacturers are aware of how they can develop their products to mitigate extreme events and even work in partnership with other manufacturers to develop solutions. However, they need to be involved earlier in the design or even the optioneering phase of a project.



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The views expressed in this research are those of our respondents and do not necessarily reflect those of the organisations that they work for.



Supply Chain Collaboration. Is it Helping Drive Down Carbon in Infrastructure Projects?

The thoughts and findings
from interviews with key
stakeholders from different
levels of the supply chain.

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