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Unblocking healthy, low carbon and circular materials in construction

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Introduction

As low carbon and healthier material specifications become key new topic of built environment agenda, the industry is starting to recognise their critical role in reducing environmental impact and improving wellbeing. Yet despite an ever growing marketplace of innovative, sustainable products, significant barriers to widespread adoption still remain. At Cundall, we sat down with industry leaders to explore these challenges and to ask the important question: **how do we overcome the barriers to accelerate the shift toward low carbon, circular and healthier material choices?**

What emerged is that progress depends on transparency around the barriers and shared accountability across stakeholders. By clearly identifying the obstacles—and understanding each party's role in overcoming them—we can begin to remove the roadblocks that hold the industry back. This paper identifies the key barriers and the actions needed to overcome them.

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Background

In recent years, we have experienced an increasing interest in low carbon, circular, and healthier material specifications in our UK projects, reflecting a growing awareness of how building products can affect both the environment and human health and wellbeing. Research has continued to highlight such concerns, with studies dating back to 2004 detecting man made chemicals in human blood samples, raising questions about the sources of exposure and the role buildings may play. Despite this increased attention to the chemicals in products, addressing the issue within the built environment is complex. Specifying "healthier" or more "sustainable" products is not straightforward, with barriers emerging at every stage of design, procurement, and delivery.

Within the UK, progress within the built environment is often shaped by a mix of market demand and the regulatory landscape. New planning requirements and UK net zero carbon targets are driving greater emphasis on embodied carbon reduction, reporting and a renewed focus on circularity. However, they do not provide strong direction or a consistent framework for restricting potentially hazardous substances or specifying healthier products. As a result, much of the focus on the topic is driven by voluntary certification schemes such as BREEAM, LEED, and WELL. While these frameworks set valuable baselines and have accelerated industry awareness, they can fall short of representing the targets needed to drive widespread adoption of low carbon, circular and healthier products.

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Barrier 1
Financial burden

It is assumed that lower-carbon, circular and healthier materials are more expensive than standard options, however that is a myth. This perception of the financial burden of innovative, healthier, and lower-carbon materials continues to be one of the most persistent barriers across the industry. One contribution to this challenge is the burden for small and new suppliers to get their product certified and verified as low-carbon, circular and healthy. These products can be perceived to carry higher upfront costs compared with conventional alternatives, leading them to be removed during value engineering (VE) and replaced with cheaper, less sustainable options. This perception is not always based on actual products costs and can be a result of the perceived risk or lack of supply chain transparency.

Current UK taxation frameworks place VAT on retrofit and reuse, while new-build construction is zero-rated - effectively penalising low-carbon circular practices despite their environmental benefits.

Likewise, the absence of financial incentives for designing for disassembly means that end-of-life recovery provides limited economic return, discouraging manufacturers, contractors, and clients from prioritising circularity.

Cost pressures within supply chains can also make healthier and low-carbon alternatives appear uncompetitive. Long-standing agreements between contractors and major suppliers can bias procurement toward standard products with preferential pricing, making innovative materials seem disproportionately expensive. Combined with limited financial recognition of long-term health, carbon, and lifecycle savings, sustainable products struggle to compete on short-term capital cost metrics alone. These factors can collectively increase project costs, limit client confidence, and reduce the likelihood that healthier and more sustainable products will be specified or retained throughout the project lifecycle. However, it does not always have to be the case, the following actions can help shift the industry's perception.

R.J.B. Peters, "Man-Made Chemicals in Maternal and Cord Blood". *TNO Built Environment and Geosciences* (2005)

Suggested actions:

Architects

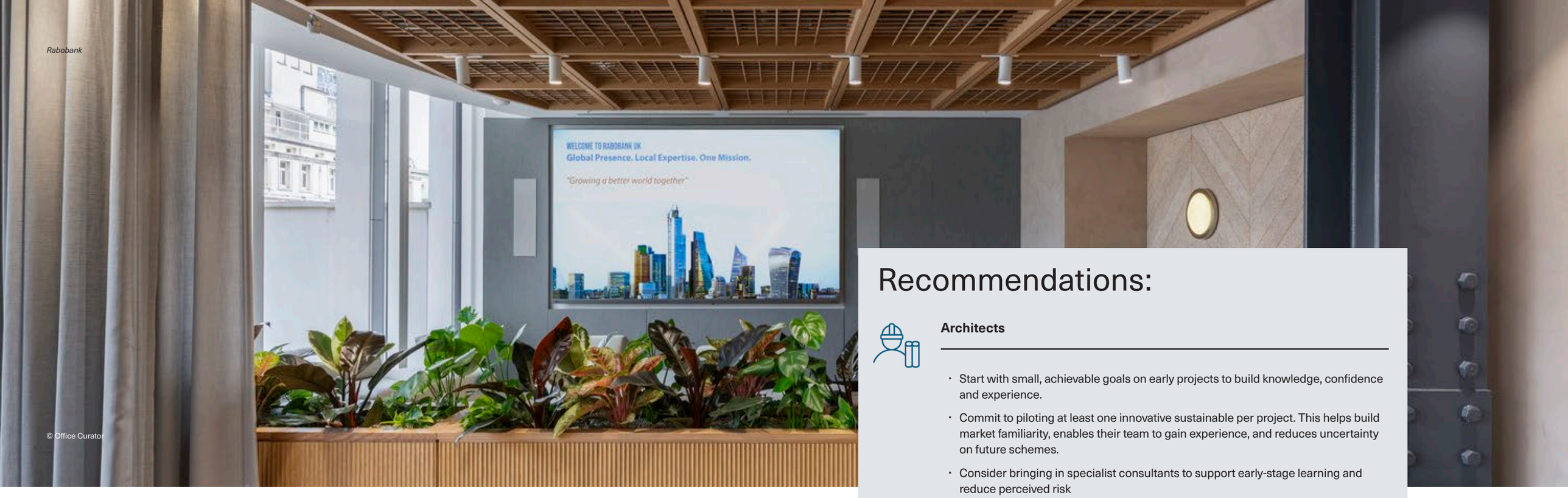
- Aim to specify the product key environmental or health properties that must be met. By doing so, it becomes much harder, or ideally impossible, for cost consultants or contractors to value engineer the materials and replace them with options that are environmentally inferior or potentially unhealthy.

Clients

- Incorporate whole-life-cycle costs in the decision matrix, considering lifespan, maintenance, and end-of-life impacts rather than just upfront savings. Reuse strategies and circular materials can offer meaningful long-term cost benefits, especially in financially constrained periods. Examples include choosing durable materials with longer service lives or products designed for future reuse.

Government

- Introduce disposal or end-of-life taxes as part of upfront product costs to incentivise materials with strong circularity and recovery pathways.
- Remove VAT from reuse and retrofit activities, shifting financial incentives toward circular practices rather than new build.



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Barrier 2

Limited education and knowledge across the industry

An obstacle to specifying healthier, lower-carbon and circular products actually emerges before a project even begins. The construction industry lacks widespread knowledge about the subject, and this burden of including such products in projects can then fall upon architects who are expected to make informed material choices alongside a wide range of other design decisions. The challenge is heightened by the limited availability of information and formal training on the subject.

As a result, teams may perceive specifying these products as high-risk or overly complex. At the same time, architects and contractors are frequently left to determine disassembly methods and end of life strategies themselves, even though manufacturers are the true experts on their own products. This misalignment contributes to inconsistent outcomes and slower adoption across the industry.

Recommendations:

Architects

- Start with small, achievable goals on early projects to build knowledge, confidence and experience.
- Commit to piloting at least one innovative sustainable per project. This helps build market familiarity, enables their team to gain experience, and reduces uncertainty on future schemes.
- Consider bringing in specialist consultants to support early-stage learning and reduce perceived risk
- Use storytelling and clear communication to build client understanding and encourage the adoption of healthier or circular materials.

Wider Industry

- Strengthen university-level architecture, engineering, and design curricula by incorporating modules on circularity, designing for deconstruction, and material health.
- Request product information in order to deepen understanding and encourage suppliers to disclose details that are not typically shared—such as full chemical content lists—so that, as an industry, we become more informed on the subject.
- Commit to piloting at least one innovative sustainable per project. This helps build market familiarity, enables their team to gain experience, and reduces uncertainty on future schemes.

Contractor

- Commit to piloting at least one innovative sustainable per project. This helps build market familiarity, enables their team to gain experience, and reduces uncertainty on future schemes.

Manufacturer

- Invest in low-carbon, healthy materials by eliminating harmful chemicals from products and supporting circular practices—such as prioritising recycled materials over virgin resources and offering take-back schemes.
- Provide clear end-of-life and disassembly guidance for products, helping project teams make informed decisions based on the expertise of those who know the materials best.

Barrier 3
Lack of industry consensus

A further challenge is the absence of industry-wide agreement on how material data should be collected, formatted, and shared. Even among those committed to sustainable materials, there is significant inconsistency in the type and quality of data provided. Without a common structure or shared standards, companies are forced to create their own internal databases, each slightly different from the next. This fragmented approach not only requires significant staff time but also results in manufacturers receiving repeated, overlapping requests for similar information, creating unnecessary administrative burden. The lack of a centralised, trusted data source also makes it difficult for teams to collaborate or compare like-for-like materials. Additionally, concerns around intellectual property often limit transparency and data sharing, slowing down progress toward healthier, lower-carbon material choices.

Potential solutions:

Wider Industry

- Align around a common set of core minimum product data requirements, with consistent formatting to enable interoperability.
- Develop a centralised, third-party-verified database that serves as a shared, trusted resource across the supply chain.

Manufacturer

- Take ownership for hosting and maintaining accurate, up-to-date material data, ensuring it is accessible to project teams without repeated requests.

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Barrier 4

Limited track record, performance risks and supply-chain constraints

The lack of an established track record for many innovative products remains a key barrier to adopting low-carbon and healthier materials. Without long-term performance data or widespread installation experience, subcontractors often perceive these materials as higher-risk. This uncertainty can impact programme durations, workmanship assurance, and ultimately project cost, all of which are significant concerns, especially for risk-conscious clients and developers.

Subcontractors frequently report that new materials introduce unknowns in terms of installation methods, handling, sequencing, or durability. Because these deviate from established norms, they can be viewed as potential disruptions to programme certainty. In turn, contractors may price this risk into their tenders, making healthier or lower carbon options appear less commercially attractive.

In some cases, existing supply chain agreements between contractors and mainstream suppliers can further elevate costs. These agreements may favour familiar products with existing commercial relationships, making it more challenging for alternative materials to compete on cost or availability. Together, these factors create a perception that innovative materials carry greater financial and performance risk, slowing their adoption across projects.

Ways forward:

Contractor

- Host "test days" or hands-on trials where subcontractors can practice installing new or innovative products, helping to reduce uncertainty around application methods.
- Advocate for greater transparency in subcontractor pricing, including clearer breakdowns of labour and material costs, to better understand where risk allowances are being added.

Architects and Manufacturers

- Involve manufacturers early in the design process once a product is selected. Their technical expertise can support both client decision-making and contractor understanding, strengthening confidence in the product's performance and installation requirements.
- Provide warranties to help reduce clients', architects', and contractors' perceived risks when adopting new materials.

Clients

- Commit to piloting at least one innovative sustainable product per project. This helps support manufactures who are producing the healthy sustainable materials and to build market familiarity, enabling contractors to gain experience, and reduce uncertainty on future schemes.

Other considerations

There are several additional considerations and solutions which were not covered by our discussions and paper but remain important in driving progress. The list below includes potential areas which warrant further exploration in future work.

- The role of public procurement and policy, which could influence the market at scale.
- The potential for mandatory reuse, recycling, or circularity targets set by local or national government.
- The impact of the insurance sector, where current risk perceptions often limit the use of innovative or reused materials.
- The standardisation and certification process of new products. While thirdparty verification offers architects, contractors, and insurers greater confidence in a product, the certification process is often lengthy and expensive, resulting in many innovative products struggling to meet these requirements early on.

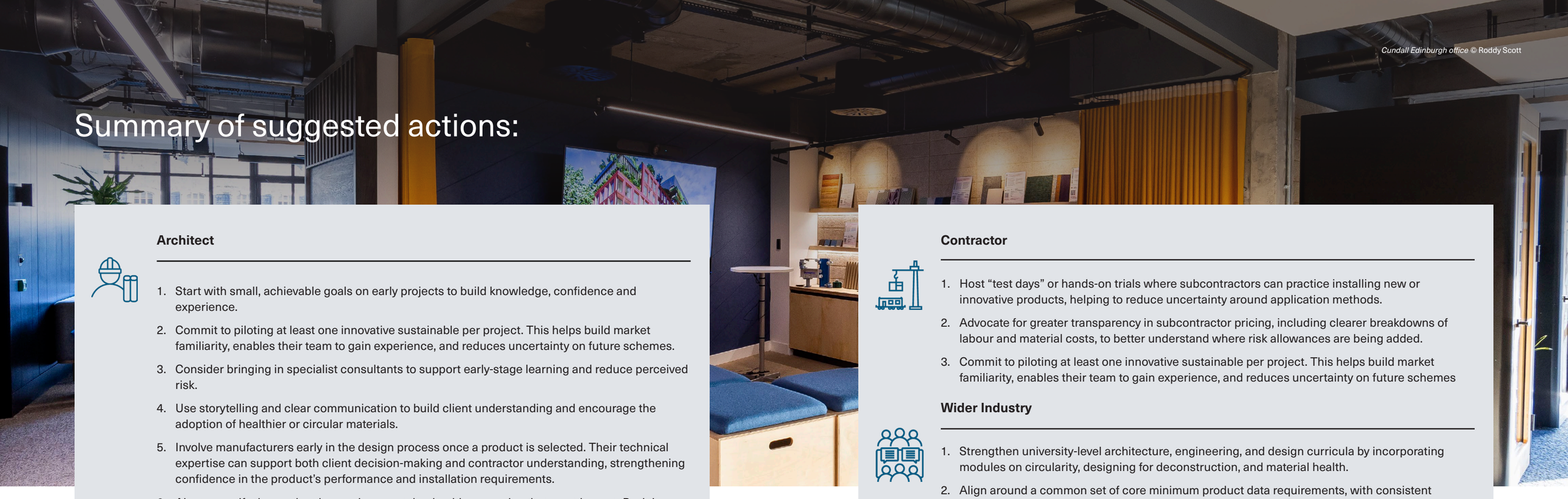
Conclusion

The shift toward low carbon, circular, and healthier materials is gaining momentum, but progress is still constrained by industry wide gaps in knowledge, inconsistent data, limited track record, and financial barriers. Through our discussions with industry leaders, it is clear that meaningful change requires collaboration: improving education, aligning data standards, sharing experiences, building confidence through practical trials, and creating financial frameworks that support, not penalise, healthy and sustainable choices. While this paper focuses on four primary barriers, additional levers such as public procurement, policy reform, mandatory targets covering carbon, VOC limits, circularity, low carbon requirements, and any other criteria that support sustainability, circularity, and healthy material outcomes, and insurance sector alignment will also be critical to accelerating adoption across the built environment.

Thank you to the industry leaders who joined our roundtable and helped strengthen the solutions proposed by this paper. Special thanks to Philippa Birch-Wood, Ren DeCherney, Asif Din, Zoë Glander, Phanos Hadjikyriakou, Greg Norman, and Debbie Ward whose thoughtful input and expertise greatly informed our recommendations.

Suggested Knowledge Sources:

- www.sixclasses.org – Information on chemicals of concern and how to avoid them
- www.healthymaterialslab.org – The next generation of materials: Guidance and tools on healthy materials
- www.routledge.com/Materials-An-environmental-primer – Materials, an environmental primer by Hartman and Williams



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Summary of suggested actions:

Architect

1. Start with small, achievable goals on early projects to build knowledge, confidence and experience.
2. Commit to piloting at least one innovative sustainable per project. This helps build market familiarity, enables their team to gain experience, and reduces uncertainty on future schemes.
3. Consider bringing in specialist consultants to support early-stage learning and reduce perceived risk.
4. Use storytelling and clear communication to build client understanding and encourage the adoption of healthier or circular materials.
5. Involve manufacturers early in the design process once a product is selected. Their technical expertise can support both client decision-making and contractor understanding, strengthening confidence in the product's performance and installation requirements.
6. Aim to specify the product key environmental or health properties that must be met. By doing so, it becomes much harder—or ideally impossible—for cost consultants or contractors to value engineer the materials and replace them with options that are environmentally inferior or potentially unhealthy.

Client

1. Commit to piloting at least one innovative sustainable product per project. This helps support manufactures who are producing the healthy sustainable materials and to build market familiarity, enabling contractors to gain experience, and reduce uncertainty on future schemes.
2. Incorporate whole-life-cycle costs in the decision matrix, considering lifespan, maintenance, and end-of-life impacts rather than just upfront savings. Reuse strategies and circular materials can offer meaningful long-term cost benefits, especially in financially constrained periods. Examples include choosing durable materials with longer service lives or products designed for future reuse.

Manufacturer

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3. accessible to project teams without repeated requests.
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5. Provide warranties to help reduce clients', architects', and contractors' perceived risks when adopting new materials.

Contractor

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2. Advocate for greater transparency in subcontractor pricing, including clearer breakdowns of labour and material costs, to better understand where risk allowances are being added.
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