

Viewpoint

Racing to zero: embedding a carbon-conscious approach to designs and advice

David Leversha, Diego Padilla-Philipps and Emma Francois explain how their firm, WSP, has approached its decarbonisation goals and what progress it has made in the past five years.

In 2020, inspired by the UN Race to Zero, WSP UK made a commitment to halve the carbon in its designs and advice by 2030. A joint article with Buro Happold in *The Structural Engineer*¹ set out the rationale for the target, while also encouraging others to set ambitious targets.

We should bear in mind that 2030 is an interim target as humanity has to achieve net zero by 2050 in order to avoid the worst impacts of climate breakdown. The aim behind the WSP UK commitment was to stimulate change in a relatable timeframe. While a numerical target is important, we have been conscious to guard against *perfection becoming the enemy of good*.

This article disseminates interventions introduced into the buildings division of WSP UK to facilitate the changes required, alongside progress made within structural engineering designs.

Benchmarking and progress

The 2020 benchmarking process for WSP UK structural engineering involved the A1–A5 carbon measurement of structural elements from 91 design projects of various types and sizes, across 12 sectors, from 11 UK regions. The mean average of those projects was 333kgCO₂e/m².

A review undertaken in 2024 (on the same basis as above), confirmed a mean average of 235kgCO₂e/m² based on 59 live projects. Against the 2020 baseline, this demonstrates a 29% decrease, i.e. within the structural engineering practice, we can evidence near 60% progress against the 2020 halving commitment.

All calculations have utilised WSP's in-house carbon calculator. Since the 2024 review, the calculator has been updated to reflect the second edition of the RICS Professional Standard². Looking forward, WSP UK structures has mandated that all design projects with a fee greater than £30,000 record their decarbonisation interventions

and calculate the embodied carbon. Enhanced data collection will allow sector-specific comparisons against the UK Net Zero Carbon Buildings Standard (UKNZBS; www.nzcbuildings.co.uk/pilotversion).

Approach to decarbonisation

When establishing our approach to project decarbonisation in 2020, we were mindful of two phenomena. The first relates to how decision-making processes occur, as defined in *Thinking, Fast and Slow* by psychologist Daniel Kahneman (**Figure 1**)³.

Kahneman proposed that 95%

SYSTEM 1 Intuition & instinct

95%

Unconscious
Fast
Associative
Automatic pilot



SYSTEM 2 Rational thinking

5%

Takes effort
Slow
Logical
Lazy
Indecisive

FIGURE 1: System 1 and system 2 thinking (as proposed by Kahneman)

of human decisions are based on intuition and instinct, which in turn are based on lived experiences. This is known as ‘system 1’ thinking. While system 1 thinking is fast, it does not encourage exploration of innovation.

The remaining 5% of human decisions result from ‘system 2’ decision-making, which is based on rational thinking. While system 2 requires more effort, in the context of the climate emergency, it is imperative that all parties disengage autopilot and explore alternative solutions in response to the constraints and opportunities that exist.

The second phenomenon is the five inner defences, as summarised by Per Espen Stoknes in his TED talk ‘How to transform apocalypse fatigue into action on global warming’⁴.

Table 1 details the solutions utilised and communicated to assist engineers to think slowly and logically through these five inner defences, helping them to succeed in the cultural and technological transformation required to decarbonise designs and advice.

One initiative associated with delivering successful decarbonisation has been the creation of the annual WSP UK Buildings Decarbonisation and Sustainability Awards. This year the structures decarbonisation team won the judges’ award (for the transformation detailed in this article), while the small project award went to an adaptive reuse project that witnessed the transformation of a car repair workshop into a community health diagnostic centre. The centre is at the heart of a community and has delivered significant carbon savings through the integration of mezzanines and rooftop plant-support structures (against demolition and rebuild) alongside broader health and wellbeing benefits.

The solutions noted in **Table 1** focus on upskilling all members of the WSP UK structural engineering team, outlining why resistance to change is natural and demonstrating that system 2 thinking requires courage and tenacity. Even if clients initially resist change, having conversations and exploring lower-carbon solutions may plant the seed for a change in thinking, which may hopefully result in increased impact on future projects.

When reviewing the journey to date, no single solution stands out from the data. While some projects have achieved significant carbon reduction through refurbishment, the majority

have benefited from a ‘marginal gains’ approach where many topics have seen beneficial carbon savings. These topics are summarised in **Figure 2** and have required a truly holistic approach to system 2 thinking, while ensuring the value associated with the changes is clearly articulated.

Summary

Our own progress has been greatly assisted through collaboration with organisations including the IStructE, ConcreteZero, SteelZero, the UKNZCBS, the Centre for Net Zero High Density Buildings and The Engineers Reuse Collective, and it is appropriate to applaud the efforts of everyone involved. Further industry-wide collaboration will be essential to drive innovation and scale implementation across the full spectrum of initiatives, including Part Z in the UK (an industry-proposed amendment to the Building Regulations), steel reuse, material innovation and scaling, coupled with circular economy and regenerative design principles.

Taking inspiration and guidance from outside of the industry, the need for acceleration and collaboration was further reinforced by the International Court of Justice decision on the ‘Obligations of States in respect of Climate Change’¹⁰. The implications of the judgement will take time to filter down through the system, but Will Arnold’s belief that ‘states and large emitters of carbon are legally obliged to reduce emissions and prevent harm to people and ecosystems from climate change’¹¹ will certainly impact on the decision-making associated with traditional material suppliers and large manufacturers.

“**IF CLIENTS INITIALLY RESIST, HAVING CONVERSATIONS AND EXPLORING LOWER-CARBON SOLUTIONS MAY PLANT THE SEED FOR A CHANGE IN THINKING**”

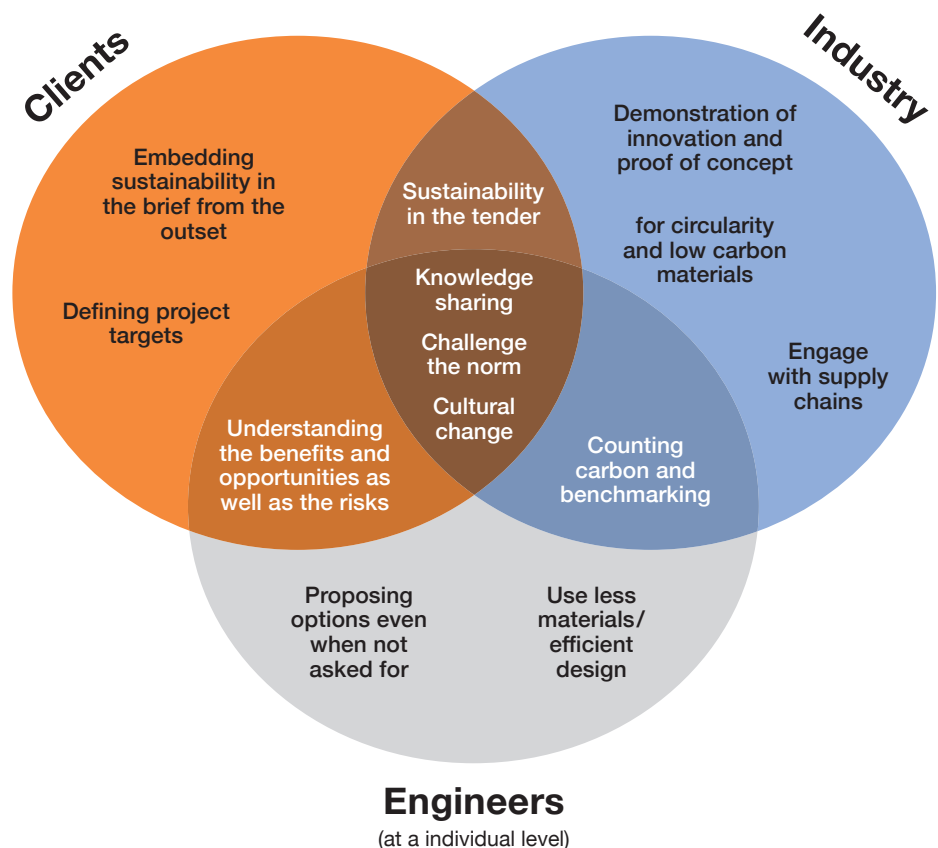


FIGURE 2: Focal points for delivering carbon-conscious designs

Table 1: Solutions developed and utilised in response to five inner defences

Five inner defences		Five evidence-based solutions in the structural engineering (and WSP) world
<p>Distance</p> <p>Climate change feels remote – both in terms of time and distance.</p>	<p>Change the narrative to make it personal, relevant and local.</p> <ul style="list-style-type: none"> → The 50% reduction commitment introduced a manageable timescale for action, while reports such as <i>The London Climate Resilience Review</i>⁵ (that demonstrated impacts are occurring in our own neighbourhood) were shared. → IStructE guidance. If the average engineer can reduce their designs by 20%, 200t a year could be saved. → The LETI ‘shifting the peak’ diagram⁶ illustrates that the bulk of our emissions and thus the biggest opportunity resides in ‘normal’ (not exemplar) projects; therefore, everyone can have a positive influence. → Refurbishment (rather than demolition and new-build) will reduce construction traffic and corresponding disruption, poor air quality and acoustic pollution in your community. 	
<p>Doom</p> <p>Messaging around climate is often framed as catastrophic, leading to apathy.</p>	<p>Frame sustainable design as an opportunity.</p> <ul style="list-style-type: none"> → ‘Using less stuff’ should save money when implemented without increasing labour costs, while adaptation will protect against stranded asset risks. → Include transitional and physical risks on project risk register to incentivise alignment with funding/client’s high-level strategies to protect against stranded asset risk. → WSP input to the World Green Building Council initiative ‘Beyond the business case’⁷ and subsequent ‘Circularity Accelerator’⁸ programme demonstrates positive economic benefits in responding to the climate emergency. → WSP UK gaining PAS 2080:2023 certification and developing in-house guidance to underpin high-quality, conscious carbon management as ‘business as usual’. 	
<p>Dissonance</p> <p>Conflict between knowledge and behaviour creates discomfort. Engineers may know the impact of design but still use carbon-intensive options.</p>	<p>Promote low-carbon solutions and make them easy to implement.</p> <ul style="list-style-type: none"> → Development of in-house steel reuse and parametric modelling tools including DAISY⁹. → Guidance and advice on efficient structural design. Elimination/reduction of cantilevers, transfers, basements, project-specific loadings, etc. → Design checklists aligned to RIBA work stages. → Update reporting templates to demonstrate the impact of design decisions on project carbon. → Update specifications to reflect ConcreteZero and SteelZero commitments and efficient utilisation of scarce resources. 	
<p>Denial</p> <p>Avoiding climate considerations due to complexity or perceived irrelevance.</p>	<p>Integrate sustainability metrics into standard design workflows.</p> <ul style="list-style-type: none"> → Utilisation of carbon calculators and project benchmarking. → Demonstrate change is possible as evidenced through an initiative to reuse structural steel. → Internal surveys of the buildings team in Q4 2023 and 2024 confirmed approx. 70% feel knowledgeable and empowered to debate decarbonisation with clients. → Monthly reporting indicates that, for the three-month period to August 2025, 27% of design projects (by fee value) have a client requirement to measure/reduce carbon. A further 19% have a voluntary commitment. 	
<p>Identity</p> <p>Information that challenges personal or professional identity is rejected.</p> <p>Sustainable design may conflict with traditional engineering norms.</p>	<p>Foster a culture where structural engineering inherently embraces decarbonisation and sustainability.</p> <ul style="list-style-type: none"> → Monthly progress meetings with Head of Discipline and Managing Director. → Comprehensive series of workshops, newsletters, training, checklists, quality assurance (QA) enhancements and tool development. → WSP Property & Buildings internal Decarbonisation And Sustainability Awards to share best practice and demonstrate what is achievable. → Active member of UK Green Building Council, UKNZCBS, Engineers Reuse Collective, along with other industry initiatives. → Carbon management minimum requirement checklist mandatory in monthly project reporting for projects with a fee >£30K. 	

In summary, a decarbonised future requires every constraint to be challenged and every opportunity to be explored. Creating a carbon-conscious approach to designs and advice within WSP has been influenced by experts outside of our industry, such as Daniel Kahneman and Per Espen Stoknes. Influencing decision-making and culture is at the heart of the decarbonisation challenge.

The approach has therefore focused on creating a supportive environment where innovation can flourish and everyone is empowered to challenge the status quo. While acknowledging the challenge has been harder than anticipated, we continue to push boundaries, support all colleagues and seek to continue persuading clients, industry and government of the value associated with embracing a decarbonised and resilient

approach to the built environment.

By publishing this article and sharing the experiences of our carbon-reduction journey to date, we hope to inspire and aid you in embedding a carbon-conscious approach into your own work, and to encourage you to share your own lessons learned. Continued cross-industry knowledge-sharing is vital for faster progress in our joint aim of achieving net zero.

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