



● Carbon as a formal KPI
in projects: NEC X29 and
PAS 2080

BSI webinar report

June 2023



Carbon management represents a critical challenge to the built environment industry.

At a recent BSI webinar, leading organizations in the sector discussed two key solutions.

Introduction

The webinar, led by Rahul Shah, BSI's Sector Director for the Built Environment with panelists Maria Manidaki, Technical Director - Decarbonisation, Mott MacDonald, Richard Patterson, Procurement and NEC Specialist, Mott MacDonald and Greg Lawton, Co-founder & CEO, Nodes & Links, set out to explore potential carbon management solutions for the industry. It focused on two key solutions: the use of sustainability provisions in construction contracts (specifically, NEC X29), and PAS 2080:2023, the recently revised version of the standard designed to help reduce carbon emissions in buildings and infrastructure.

The seminar began by explaining what NEC X29 and PAS 2080:2023 are, and how they help to address the key issue of carbon management as a formal key performance indicator (KPI) in buildings and infrastructure

projects. It then went on to show how, in different ways, they both help built environment organizations meet the challenge of reducing their carbon footprint.

BSI and the organizations represented at the webinar are firmly committed to sustainable development goals, including carbon management.

Our aim is to highlight the benefits that effective carbon management can bring to built environment organizations, to the clients and communities they serve, and to the UK economy as a whole.

We trust that this report increases awareness of the importance of carbon management in projects and encourages organizations throughout the sector to adopt the solutions discussed.



Background

Built environment professionals will be familiar with the New Engineering Contract (NEC). Today, it is no longer new, nor in fact a single contract. First developed in 1993 by the UK Institution of Civil Engineers (ICE), the NEC is a series of contracts designed to manage projects from start to finish. There have since been three further NEC editions, the most recent, NEC4, in 2017.

To be easily understood and adopted throughout the industry, the contracts were structured simply and drafted in plain English. Endorsed by both government and industry bodies, their overarching purpose was to reduce the number of costly construction disputes that resulted from traditional adversarial contracts.

Over the years, as well as cutting the number of disputes, NEC contracts have built a strong track-record for helping to deliver major projects on time and within budget.

Over those same years, the world has woken up to the fact that it is facing a climate change emergency, and the built environment industry is increasingly aware that its activities are contributing to the crisis. The solution lies in creating and operating built assets sustainably and, specifically, by achieving the target of net zero emissions of carbon dioxide and other greenhouse gases.



The NEC X29 Clause

ICE and other leading built environment organizations observed that reducing the impact of the creation, operation, maintenance and disposal of built assets on climate change is principally a technical issue addressed in the 'Scope' (a defined term in the contract that includes the specification and description of works the contractor is to provide). They recognized limitations in this approach, however, because it relies on users including the required content in the Scope and linking this to the contractual processes in the contract.

It was clear that additional conditions of contract were needed to drive the reduction of the impact of the works on climate change. This led to NEC's development of the 'Secondary Option X29, Climate change' an optional NEC

contract clause introduced in July 2022 that:

- Signposts the issues to be covered in the scope and/or raise its profile
- Incentivizes performance against any targets, which may include climate change targets
- Adds to existing processes or create new ones that help reduce the impact of the works, service and supply on climate change.

Versions of the X29 clause have been produced for all NEC4 main and main subcontract forms. The aim is to enable the consideration of climate change at every stage in the life of an asset, and to support the engagement of clients and the supply chain.

The online debate kicked off with a presentation by **Richard Patterson**, a procurement specialist with engineering consultancy Mott MacDonald, and a member of the NEC team that developed X29. He explained the clause and highlighted its key elements, which include:

Climate Change Requirements

Requirements – which will be specified in the scope of works and which the contractor is required to comply with. These could include requirements such as reducing waste or carbon emissions through design. If the contractor fails to comply, and the failure relates to the works (ie. the asset being constructed), it will be a defect and must be remedied.

Patterson pointed out that, "For the last 20 years, if a client wanted to put things relating to climate change in the scope, they could, so this part of X29 really doesn't change anything other than prompting a client to think about climate change requirements in detail."

But, he warned, requirements need to be measurable and achievable, while also being more than simply box-ticking.

"Be careful with this document, because if we put in requirements that are too onerous, then bidders either won't bid or they'll include ridiculous price allowances in their bids."

Climate Change Plan

The contractor's strategy for achieving the Climate Change Requirements, including matters such as project stakeholders and timescales. "We choose to take a fairly light touch for the climate change plan," said Patterson.

Performance Table

For reporting on compliance with specified performance targets. "This is probably the most important part of X29, because the client can set financial rewards and penalties to incentivise the contractor to achieve these targets," said Patterson.

He continued, "This is a choice, so the client could choose to put in these targets and just require the contractor to report on performance, or the client can include damages and/or bonuses for missing and/or beating the target. The client can put a limit on the amount

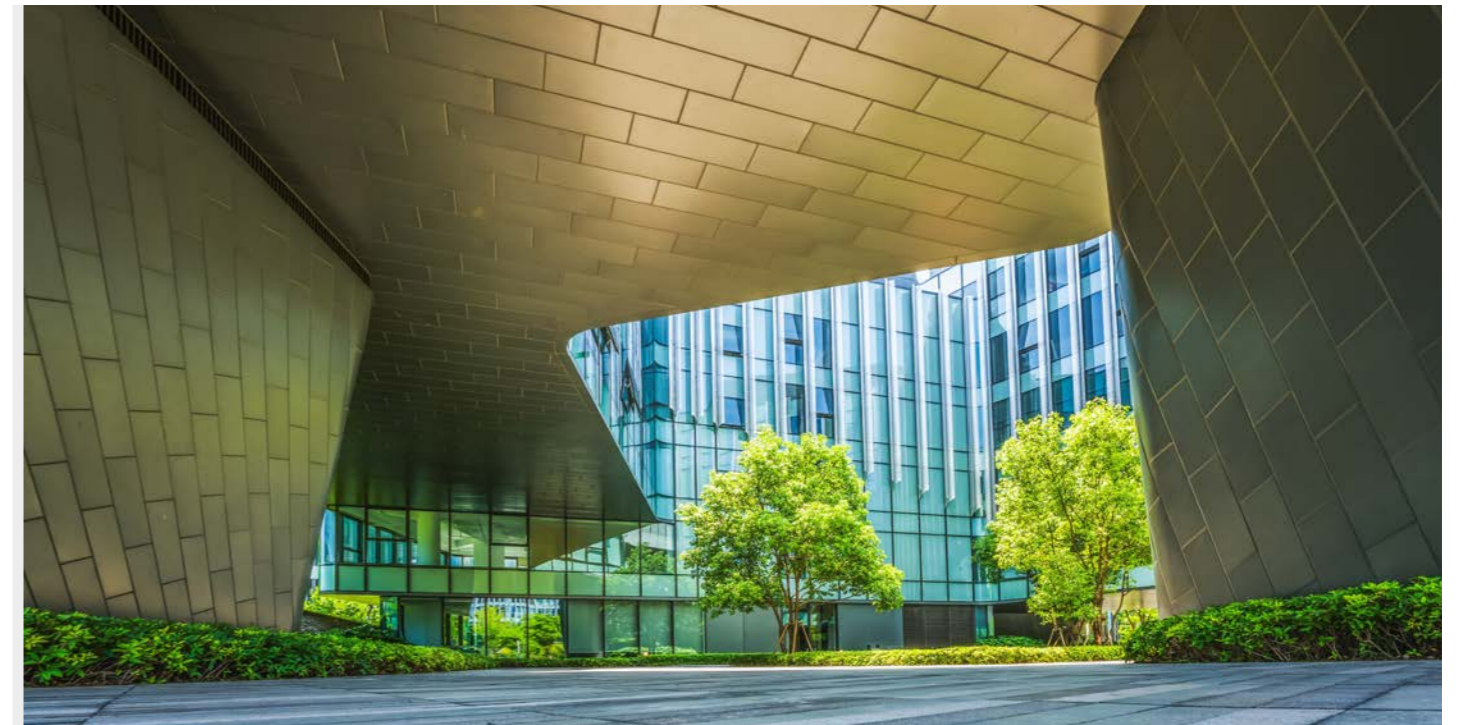
"I like to see meaningful incentives in contracts. But we need to consider what we are setting targets for. Any target is clearly going to need some measurement rules and metrics."

if they want to limit the contractors' liability or pay or the amount of the bonus."

He added, "So it's really very simple in principle. You can include targets for things relating to operational cost and assess your bids on whole life cost."

See '[Using NEC4 and option X29 to achieve lowest whole life cost](#)', Richard Patterson and Alec Kowalski, Mott MacDonald, NEC Newsletter, November 2022

Patterson argued that NEC X29 could serve as a useful tool to incentivize the reduction of carbon emissions throughout the project lifecycle, but the clause demands careful thought. Other participants agreed that, while the clause offers a framework for contractual agreement on carbon reduction measures, what those steps are must still be carefully thought through.



PAS 2080:2023

The seminar then moved on to consider the standard PAS 2080:2023.

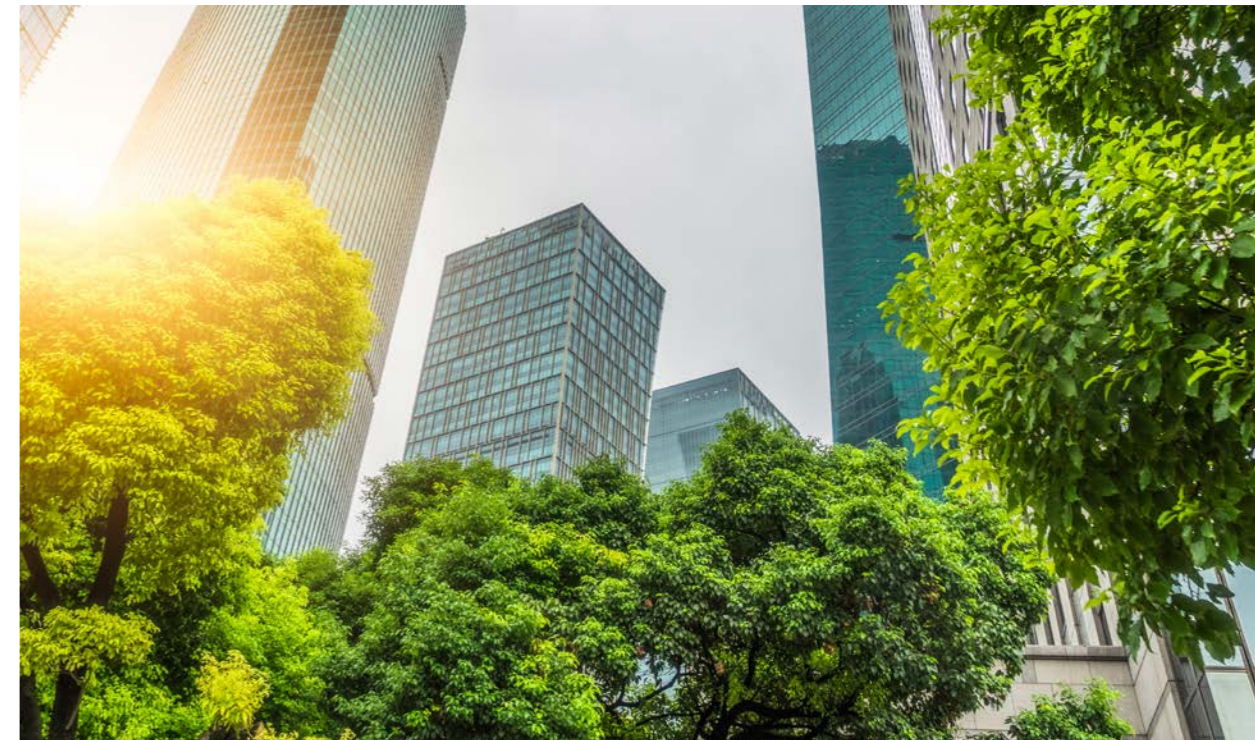
BSI originally facilitated the development of PAS 2080 – Carbon management in infrastructure in 2016. The initiative followed a government-commissioned review that found infrastructure was responsible for over 50% of the UK's carbon emissions, showing that the sector faced a huge challenge to meet net zero targets.

PAS 2080, a fast-track standard, was a rapid response to this challenge. It was the world's first standard for managing whole life carbon emissions in infrastructure, providing a framework that covered the whole value chain, reducing both carbon and costs through more intelligent design, construction, and use. It also set out to ensure that carbon would be consistently and transparently measured at key points in infrastructure delivery.

Maria Manidaki, Technical Director for Decarbonisation at Mott MacDonald and part of the technical author team for PAS 2080, explained how the standard has been pivotal in helping companies to reduce whole life carbon in buildings and infrastructure by:

- Adopting a systems approach to whole life carbon management that aligns with the Net Zero transition
- Setting appropriate carbon reduction targets
- Determining baselines against which to assess carbon reduction performance
- Establishing metrics and KPIs for credible carbon emissions assessment and reporting
- Selecting carbon emissions assessment methodologies that will inform whole life carbon reductions and removals
- Focusing on how data and technical solutions can inform decision-making at all work stages, when delivering projects and programmes of work to enable visibility of performance

- Setting carbon management priorities in procurement to enable to right behaviours and incentives for whole life carbon reduction
- Continual improvement of carbon management and performance.



In 2022, the technical author team carried out a thorough update of the standard, with the revised version finally released in April 2023. Manidaki commented on the five main themes in the new version of PAS 2080:2023:

- 1 Buildings and infrastructure** – “The standard has expanded its scope to include whole life carbon management in buildings and infrastructure.”
- 2 Systems thinking and alignment to the net zero transition** – “How we encourage our value chain players to look beyond project boundaries when it comes to addressing and implementing decarbonization opportunities at the systems level.”
- 3 Taking a whole life view and focusing on actions that drive low carbon decision-making** – “We need to focus on decision-making rather than solely assessing and reporting carbon emissions.”

4 Considering nature-based solutions and resilience – “Acknowledging that they are part of the wider decision-making process and such solutions may have positive and negative impacts on whole life carbon emissions and removals.”

5 Promoting the right behaviours and value chain collaboration – “Stronger requirements around working together, with renewed focus on procurement, which is a key enabler for collaboration, cost and carbon efficiencies.”

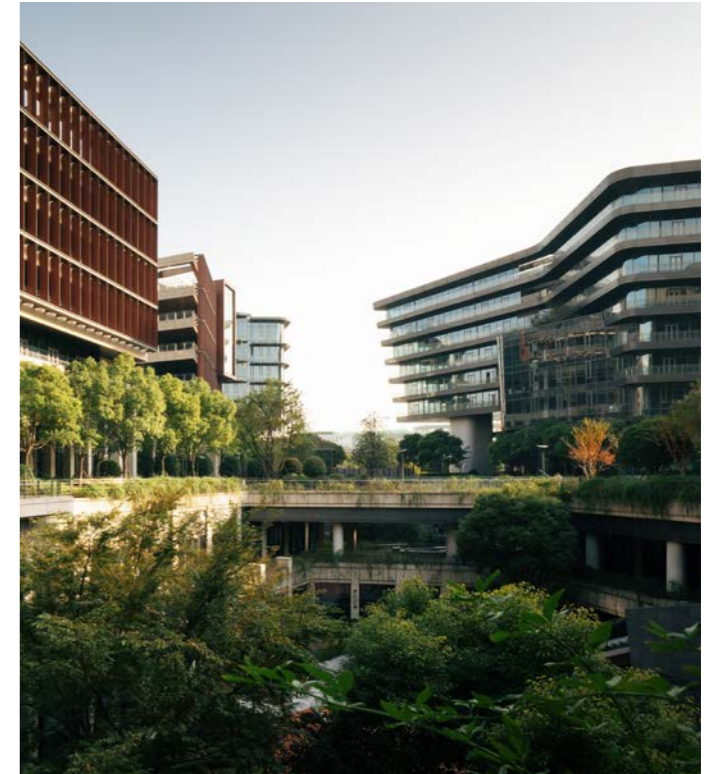
Manidaki explained that the updated standard provides an improved framework that all parts of the value chain can apply, helping them gain clarity and consistency to reduce carbon when delivering projects and programmes of work.

She added that guidance is needed to enable consistency in the way the built environment industry manages whole life carbon emissions. “The updated PAS 2080 provides the clarity the industry needs,” she said.

“It can help you ensure you have consistency in your baselines and targets, as well as your approach to managing whole life emissions and implementing low carbon alternatives. For example, a contractor may want to challenge the assumptions behind the baseline before they sign a contract with NEC X29 Performance Requirements and targets. PAS 2080:2023 can make sure everyone’s on the same page.”

“The original standard on carbon management has been well used within the built environment, the 2023 update is designed to further empower behavioural change on carbon reduction by helping organizations recognize and respond to the urgency for climate action.”

Anthony Burd, Associate Director and Head of Built Environment, BSI



Greg Lawton, founder of Nodes and Links, an automation and AI company, provided further insights into the real-world challenges of carbon measurement, assessment and valuation. Having successfully partnered with HS2 and other clients to qualify track, predict, and reduce carbon in their projects, he explained that different organizations have varying levels of maturity when it comes to their ability to track carbon.

“First of all, it depends on their specific definition of the carbon they’re dealing with,” he said. “Generally, you have the embodied carbon within the structure itself, then you have the emitted carbon during the operational build of

“Carbon will just become another KPI, like projects schedules and costs.”

the project. You have the ‘prelims’ carbon, which is separate to the direct build of the project, and then you’ve got the ongoing carbon.”

Lawton then explained that, through a variety of complex methods and calculations – for example, based on emissions trading schemes – it is now possible to put a price on carbon and this process will become more consistent in the future.

“For the built environment sector to be net zero by 2050 in the UK, organizations need to be better at managing and reducing whole life carbon in buildings and infrastructure. PAS 2080 combined with the NEC contract clause X29 provide a common framework to measure carbon formally and enable the required behavioural change to maximize the whole life approach to carbon reduction.”

Rahul Shah, Sector Director EMEA, Built Environment, BSI

This report was based on content from a BSI webinar ‘Carbon as a formal KPI in projects: NEC X29 and PAS 2080’ that was hosted in January 2023. To watch the full webinar replay [visit](#):



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Procurement and NEC Specialist,
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Maria Manidaki
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Greg Lawton
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About BSI



The world's first standards organization, BSI remains a leading global standards business and is responsible for creating many of the world's most commonly used management systems standards. It was BSI that produced BS 5750, the precursor to ISO 9001; and the first environmental management standard (now ISO 14001) back in 1992. The portfolio of 35,000 current standards includes major new standards that address key issues facing today's global society and economy.

At BSI, we are committed to sustainable development and to advancing the UNSDGs, both through our own actions and by helping our clients make sustainable choices. Through the reach of our standards, stakeholders and clients, our greatest contribution to sustainability is through the work we do with others. Recognizing that all the UNSDGs are interconnected, and that our Royal Charter requires us to co-ordinate efforts for the benefit of society, we make our most significant contribution through SDG 17 Partnerships for the goals, and have identified an additional six goals that we believe we can advance:

- **Goal 3:** Good health and wellbeing
- **Goal 7:** Affordable and clean energy
- **Goal 8:** Decent work and economic growth
- **Goal 9:** Industry innovation and infrastructure
- **Goal 11:** Sustainable cities and communities
- **Goal 12:** Responsible consumption and production

Next steps: How BSI can help

BSI's Rahul Shah concluded the webinar by stressing BSI's commitment to supporting the built environment industry in meeting its sustainability challenges. The introduction of NEC X29 and PAS 2080:2023 will contribute to this strategic objective, representing key carbon management solutions for the sector.

In particular he explained that, to provide confidence and trust in the implementation process for PAS 2080:2023, BSI has developed a new management system verification scheme against its requirements. He highlighted our aim to encourage organizations to adopt the updated PAS 2080:2023 standard and seek the assurance provided by BSI certification to it.

For further information on BSI certification to PAS 2080:2023, and details of our portfolio of sustainability solutions for the built environment:

Call: [+44 345 0765 606](tel:+443450765606)

Email: product.certification@bsigroup.com

Visit: bsigroup.com/pas-2080-uk



Note: As an accredited certification body, BSI Assurance cannot offer certification to clients where they have also received consultancy from another part of BSI Group for the same management system. Likewise, we do not offer consultancy to clients when they seek certification to the same management system.

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