

Building carbon reduction into procurement processes



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Published by the:

**Chartered Institution of
Highways & Transportation**

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Registered Charity in England No. 1136896
Registered Charity in Scotland No. SC040873
Registered Charity in Republic of Ireland No. 20103989

Published November 2023
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Acknowledgements

CIHT would like to thank all the members of the project group, without whom the document would not have been possible.

Mike O'Dowd-Jones

Co-Chair of the project group. Strategic Commissioner for Highways and Transport Services at Somerset Council.

David Ogden

Co-Chair of the project group. Executive Director Asset & Maintenance Solutions at Colas Ltd.

Daniel Pitcher	Amey
Michael Lindsay	Amey
Emily Collins	Arcadis
Mark Coates	Bentley Systems
Daniel Moore	Colas Ltd
Craig Hannam	Fosroc
Stuart Bradshaw	Lancashire County Council
Kalpini Dave	London Councils
Dr Kim Yates	Mott MacDonald
Pasha MacLachlan	Mott MacDonald
David Purser	Project Centre Ltd
Carly Wright	Ringway
Rob McDonald	Stantec
Simon Earl	Stantec
Dr David Jackson	Sweco
Barbara Butler-Griggs	VINCI
David Clegg	WSP

Recognition is also due to CIHT staff members, including **Anastasia Trofimova** and **Joan Roemmele**.

Disclaimer

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Introduction

One of CIHT's key priorities is to reduce carbon emissions from highways and transport sector activity. An area where there is considerable untapped opportunity is in the procurement of highways and transport infrastructure and services.

Procurement requirements have a huge influence on how works are delivered on the ground and the outcomes achieved from associated spend. CIHT is keen to examine the current landscape around carbon reduction through procurement and make recommendations that will enhance current practices in the sector.

This policy review sought to understand the existing policy, guidance, and contractual mechanisms to reduce carbon emissions from highways and transport activity, gauge current levels of awareness and use of existing processes, and identify areas of success and where further development is needed.

We were keen to examine the success factors beyond the legal and contractual mechanisms, and particularly explore the role of relationships, culture, and leadership. We have therefore established working groups to

examine policy and legislation, contract mechanisms and supply chain, whole-life carbon assessment, and leadership, culture, behaviour and education, with recommendations arising from each.

Our broad findings are that much of the technical standards, guidance, analytical tools, and contract mechanisms are already in place to support carbon reduction through procurement; but it is the leadership and drive in terms of firmer policy and guidance from the government and the knowledge, ambition, and confidence locally to implement appropriate processes where there is considerable opportunity for change. We also noted that a great deal of spend is already in contract, and may be locked in for some time, so we have considered how change might be introduced while in contract as well as during the procurement process.

We are grateful to the project group members for dedicating their time to this important review, and to the key thought leaders in our sector who have kindly offered their invaluable insights into how change can be achieved through leadership in this crucial area.



Chapter 1: Policy and legislation

The power of procurement as a lever for carbon reduction is significant. Gross spending via UK public-sector procurement was £379 billion in 2021/22, of which £45 billion was in the transport sector.¹ As the transport sector is the largest greenhouse gas (GHG) emissions producer, accounting for 24% of the UK's total emissions in 2020,² carbon reduction throughout the extensive supply chain is essential to achieving central government climate commitments.

Procurement policy and legislation offer significant opportunities to shape industry practice. Legislation and policy are powerful, enforceable levers to influence the industry towards collaborative innovation and improvement against consistent standards. The government recognises the importance of this approach and has already implemented legislative and policy measures aimed at reducing carbon via procurement. However, the question remains: What else should be done to leverage procurement as a means of carbon reduction?

How policy and legislation can make a difference

Policy and legislation can play a crucial role in driving behaviour across the industry, providing a framework and incentives for clients and suppliers to adopt robust carbon reduction approaches. The government's legislative and buying power means that policy and legislation changes have an effect throughout the industry, with the potential to transform understanding, commitment, and delivery.

Building the argument on the observation that innovations are often difficult to implement, policy and legislation on carbon reduction in procurement will take time. To illustrate this point, consider the shift in our industry approach to health and safety management. From a situation where competent health and safety management, low incident rates, and ambitious targets for improvement once functioned as a competitive advantage, we now recognise the importance of collaboration in achieving industry-standard practices and outcomes across all areas of business. The

introduction and updating of the Construction (Design and Management) Regulations (1994, 2007, and 2015) has been a critical enabler for this transformation, driving common terminology and processes and setting clear, enforced rules to which all parties must adhere. Public-sector clients set precise requirements for health and safety through procurement policy, with progressive improvement targets, collaborative knowledge sharing, and common evidence-based innovation expectations.

Penalties for failure to achieve them are clear and enforced, both at the legislative level (HSE-led prosecutions) and at the client/procurement level (inability to meet minimum thresholds resulting in work withdrawal). Rewards are typically received in the form of workforce safety and satisfaction, reputational enhancements, and close client relationships, as we consciously incentivise open, collaborative health and safety approaches to accelerate learning across the industry.

Achieving a similar transformation in the way businesses approach carbon reduction is challenging – and necessary. Policy, and legislation in particular, have an essential part to play in the process, levelling the playing field, setting enforceable targets, and driving the behaviours. Government funding interventions could also influence behavioural changes and the requirement to embed and accelerate carbon reduction across the sector.

Lessons from international experience³

International examples of procurement policies that drive carbon reductions have had mixed results. While procurement policy set by large public clients can be a potent lever for change, an absence of robust standards, tools and guidance can give rise to common problems including under-ambitious targets, lack of consistency of agreed standards, lack of specific measurements or criteria for evaluating carbon performance, and risk of diverting focus towards calculation issues rather than real actions.

Key lessons from international procurement policy include:

- ✔ **Set ambitious but achievable targets at the highest level of government policy:** clients struggle to justify carbon reduction requirements without central government leadership (Sydney Metro project, Australia).
- ✔ **Define specific measurements and criteria, giving examples where possible:** without a clear basis for comparison, suppliers struggle to know what to prioritise (New Zealand, the case study of a latecomer to carbon reduction in procurement that lacked specific measurements and agreed standards).
- ✔ **Include the evaluation of carbon and other environmental impacts in business models, in addition to standard whole-life costs:** optimising product lifetime leads to greater whole embodied carbon benefits (Rijkswaterstaat, Netherlands).
- ✔ **Use existing standards rather than creating new ones:** using current standards, in combination where appropriate, reduces the learning curve and allows smaller suppliers to compete (California High Speed Rail Authority, United States).

- ✔ **Ensure requirements are clear and challenging:** there is a risk of diverting focus towards calculation issues rather than taking real action for carbon footprint reduction (Swedish Transport Administration, Sweden).
- ✔ **Prioritise communication, support, training, and knowledge exchange:** without strong industry-wide understanding and a culture of knowledge sharing and collaboration, the full benefits cannot be realised (Swedish Transport Administration, Sweden – example where there was a lack of training and support).

As governments all over the world grapple with the challenges of climate change, it will become ever more valuable to learn from other countries' successes and failures and collaborate across borders to develop consistent approaches for carbon reduction.

Case study 1: The Netherlands⁴

The first country in Europe to have a formalised process for sustainable procurement was the Netherlands. In 2010, the Dutch House of Commons stated that all public authorities must implement 100% sustainable procurement by 2015. Rijkswaterstaat⁵ developed a standard methodology for infrastructure projects where the functional specification of both the tender and the quality input from the client guaranteed a high-quality and innovative solution. The government encourages carbon reduction through soft law policies (such as green deals resulting in coalitions of private and public sectors).

In the Netherlands, several tools that were compulsory for all tenders were developed to assess environmental impacts and measure carbon emissions. One of them is the *CO2 performance ladder*, which is "a certification system with which a tenderer can show the measures to be taken to limit CO2 emissions within the company and in projects, as well as elsewhere in the supply chain". The second tool is the *DuboCalc*, which is a life-cycle analysis of the sustainability value of a particular project that takes into consideration the materials that are to be used. After different options are compared, the *DuboCalc* score of the chosen design is submitted along with the tender price.

The Netherlands' approach of establishing long-term commitments and a consistent policy to achieve its sustainability goals has proved to be beneficial for stakeholders and has enabled greater investment in carbon reduction technologies and practices.

¹ UK Parliament (2022). Procurement statistics. House of Commons Library.

² Department for Transport (2022). Transport and environment statistics.

³ More details on the international case studies can be found in the Appendix.

⁴ PIARC. (2022). Carbon Neutrality of the Road Sector. A PIARC Special Project.

⁵ Rijkswaterstaat is the government agency in Netherlands responsible for infrastructure facilities and activities associated with its design, construction, and maintenance.

Policy and legislation: the UK status quo

In 2019, via an amendment to the Climate Change Act 2008, the UK committed to a legal requirement of at least a 100% reduction in the net UK carbon account by 2050. To maintain progress towards achieving this target, the government is required to set legally binding, five-year caps on emissions – known as carbon budgets – 12 years in advance and publish a report setting out proposals and policies for meeting the cumulative budgets.

The Climate Change Act also established the Climate Change Committee (CCC) – an independent statutory body whose role is to advise the government and the

devolved administrations on setting and meeting climate goals. The CCC provides the government with advice on the level of each budget, the potential ways in which different sectors could contribute, and the extent to which carbon budgets could be met through the use of permitted “flexibilities”.⁶

The latest Carbon Budget Delivery Plan, published in March 2023, sets out proposals and policies to achieve carbon budgets 4, 5, and 6, covering the period 2023–37. Relevant carbon reduction measures, dealing with the transport sector and/or procurement policy within the Carbon Budget Delivery Plan are set out in Table 1. The UK government has already committed to and/or delivered these proposals and policies.

Table 1: Carbon reduction measures in the UK Carbon Budget Delivery Plan 2023

Policy No.	Policy	Description	Legislation	Policy	Proposal
1	Active travel spending	Committed active travel spending from ringfenced and non-ringfenced funds.		X	
8	Car policies	Measures to increase the uptake of ultra-low emission vehicles, including electric vehicles (EVs).	X	X	
28	Heavy goods vehicle (HGV) policies	Measures to reduce freight emissions, including via modal shift to rail/waterway and via Regulation (EU) 2019/1242, setting CO2 emission standards for HGVs.	X	X	
31	Van policies	Regulations setting fuel efficiency targets and other minimum requirements for light commercial vehicles (LCVs).	X	X	
35	Public service vehicle (PSV) policies	Funding for low-emission buses, including the Ultra-Low Emission Bus Scheme and the Clean Bus Technology Fund.		X	
22	Making quantifiable carbon reductions a fundamental part of local transport planning and funding	Drive for decarbonisation and transport improvements at a local level via updated local transport plans and quantifiable carbon reductions guidance.			X

⁶ Flexibilities can be “surpluses from previous carbon budgets or the purchase of good-quality international carbon credits”, as stated in the UK Government Carbon Budget Delivery Plan (2023).

Table 1 continued

Policy No.	Policy	Description	Legislation	Policy	Proposal
31	Embedding transport decarbonisation principles in spatial planning and across transport policy making	Increased spatial consideration of transport schemes will raise potential uptake of walking, wheeling, cycling, and public transport, leading to additional carbon savings.		X	
47	International efforts to increase the transparency of embodied emissions and boost demand for low-carbon products	Initiatives include Clean Energy Ministerial’s Industrial Deep Decarbonisation Initiative, which the UK co-leads with India. This focuses on aligning approaches to data measurement, standards, and procurement, to ensure there is a coordinated approach to market creation across borders. An internationally agreed methodology to monitor and report on the embodied emissions of products will support data-driven private and public procurement policies as well as product labelling and standards.			X
63	Energy Technology List – Annual Review	A government list of energy-efficient products, which functions as an easy-to-use procurement tool in the building sector.		X	
141	National Procurement Policy Statement	Sets out clear principles that contracting authorities should follow organisationally to ensure they factor in net zero to procurement activities.		X	
142	Carbon Exclusion Measure Procurement Policy Note	Requires suppliers bidding for major government contracts (>£5 million) to commit to net zero and publish a Carbon Reduction Plan.		X	

As can be seen from this non-exhaustive list, relevant government initiatives have focused more on policy than on legislative change. Some of the more ambitious procurement policy on carbon reduction currently only applies to major government contracts. While certain targets – notably those for vehicle emissions – are set in legislation, policy remains the main engine for achieving them. Carbon reductions are to be delivered

via central and local government policy, with the help of funding for carbon innovations and carbon-reducing measures, and collaboration with other governments and organisations. This enables flexibility for each policy to be mandatory or optional depending on the size, type and mission of public bodies, as well as offering public-sector clients further autonomy in the way they apply each policy within their organisation.

Public procurement notes

Three existing public procurement notes (PPNs) are of particular relevance for carbon reduction in procurement. In addition to PPN 05/21 and PPN 06/21, both included in the Carbon Budget Delivery Plan, PPN 06/20 offers public-sector bodies a vehicle for specifying and evaluating climate commitments, including carbon reduction.

PPN 05/21: National Procurement Policy Statement

PPN 05/21 provides guidance for contracting authorities on the National Procurement Policy Statement (NPPS), which will require them to have regard to three national strategic priorities for public procurement. One of these priorities is social value, including climate change.⁷

"All contracting authorities should consider the following national priority outcomes alongside any additional local priorities in their procurement activities:

- ✔ *creating new businesses, new jobs and new skills*
- ✔ *tackling climate change and reducing waste, and*
- ✔ *improving supplier diversity, innovation, and resilience."*

The government intends to legislate to make it a mandatory requirement for the public sector to have regard to the NPPS when undertaking procurements.

PPN 06/21: Taking account of Carbon Reduction Plans in the procurement of major government contracts

PPN 06/21 is applicable to all central government departments, including their executive agencies and non-departmental public bodies, that conduct procurement procedures regulated by the Public Contracts Regulations 2015. Supporting the UK's

commitment to carbon net zero by 2050, the PPN sets out the need for organisations to require bidders to provide a Carbon Reduction Plan:

"Confirming the supplier's commitment to achieving Net Zero by 2050 in the UK and setting out the environmental management measures that they have in place, which will be in effect and utilised during the performance of the contract."

As stated in the Technical Standard for Completion of Carbon Reduction Plans, PPN 06/21 is applicable only to contracts valued at more than £5 million per year that have a direct effect on the environment while delivering the contract. This could be connected to the use of natural resources during the contract or require the transportation of goods and people, to name a few.

PPN 06/20: Taking account of social value in the award of central government contracts

PPN 06/20 sets out a new model to bring social value to government procurement. Mandatory for central government, the social value delivery model articulates priority focus areas for social value delivery. Organisations can select standardised objectives, model questions, and evaluation criteria from a themed menu, to provide a clear, systematic way to evaluate social value priorities in the award of a contract. A minimum of 10% of the total tender score should be allocated to social value to ensure it becomes a differentiating factor in the award of contracts.

"Fighting climate change" is one of the social value model's five themes. To support this theme, the model sets out a policy outcome, a model evaluation question, model award criteria and sub-criteria, and standardised reporting metrics, to allow contracting authorities to select the most relevant criteria and metrics for their needs while driving consistency across central government.

Carbon-related standards

PAS 2080

PAS 2080 is a BSI⁸ standard for managing carbon in buildings and infrastructure, designed to achieve three key outcomes:

1. Implement the net zero transition vision to buildings and infrastructure projects as well as the wider network by 2050 as agreed by parties in the Paris Climate Agreement 2015 to avoid devastating environmental consequences.
2. Create a collaborative environment within the sector to encourage innovative working methods that will result in positive changes for the society and the wider economic development.
3. Reduce carbon emissions and increase value in the whole life of infrastructure and buildings.

PAS 2080 (Figure 1) defines requirements for a standard process for whole-life carbon (WLC) management across eight key areas, including how to integrate

carbon reduction into procurement. The procurement standard sets out requirements for all value chain players across contracts, sourcing, and engagement, to focus on clear and evidence-based specification and selection, appropriate behavioural incentivisation, and collaborative delivery. Alignment to PAS 2080 supports organisations' ability to understand the wider impact of their assets and activities and apply an integrated, systems-based approach to accelerate carbon reduction. The new PAS 2080:2023 version includes several critical changes, such as:

- ✔ A greater focus on collaboration, leadership, and governance within the value chain and beyond that, including specific guidance and clarified roles for the government sector, financiers, and regulators.
- ✔ Specific requirements for the procurement stage and elimination of inconsistency with other existing standards and procurement notes.
- ✔ A stronger emphasis on the circular economy and WLC costing, as well as some other co-benefits of carbon reduction for climate adaptation and biodiversity net gain.

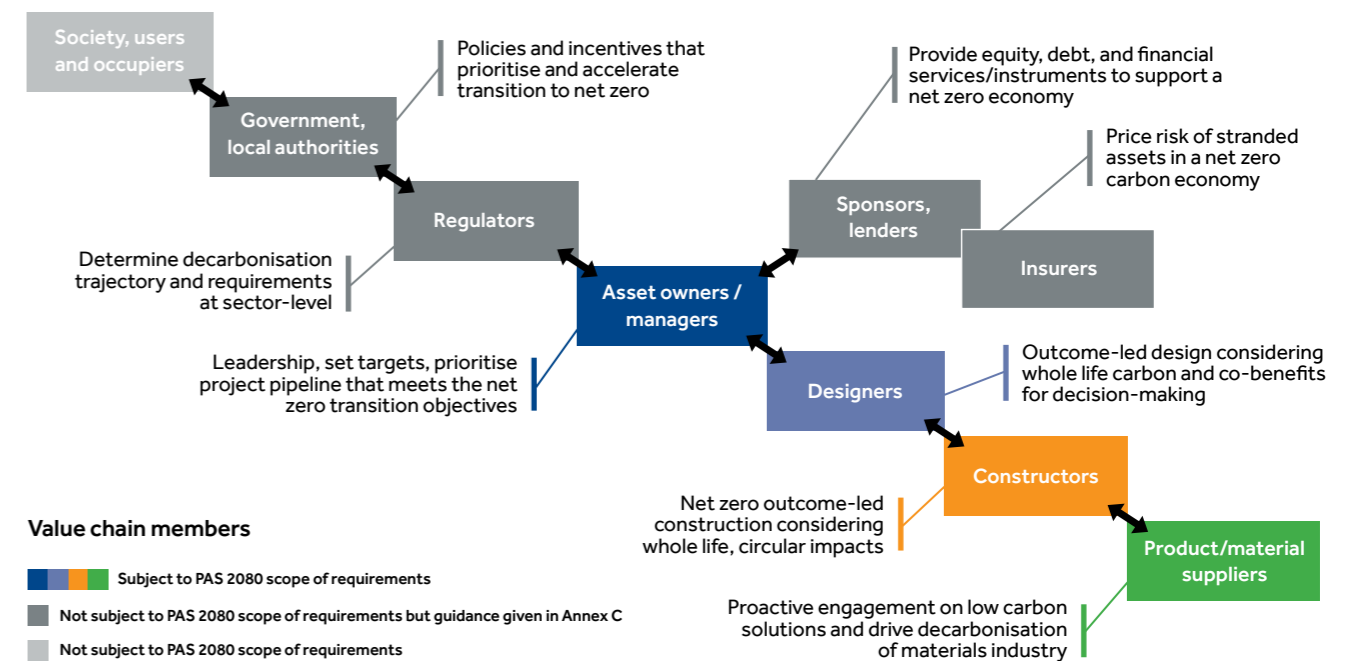


Figure 1: Value chain members in the built environment and their roles in carbon management (PAS 2080:2023).

⁷ UK Government (June 2021). National Procurement Policy Statement.

⁸ British Standards Institution

Organisations that want to demonstrate alignment with the standard can undergo PAS 2080 verification – an on-site audit process to assess their systems against the PAS that will improve the effectiveness of their activities.

ISO 20400:2017

ISO 20400 is an international standard tool to support organisations worldwide wanting to integrate sustainability into their internal procurement processes. The standard defines sustainable procurement principles, including accountability, transparency, respect for human rights, and ethical behaviour. It highlights critical considerations such as risk management and priority setting. It also covers various stages of the procurement process, outlining

the steps required to integrate sustainability into the purchasing function.

ISO 20400 has four main principles for adherence to its varied goals for sustainable development:

1. Understand the basics of sustainable acquisition and social responsibility.
2. Incorporate sustainability into the entity in question, using both policy and strategy.
3. Organise all moving parts of the organisation to improve sustainability.
4. Implement sustainable practices throughout the entire process.

The guidelines in ISO 20400 cover the principles, core areas, and drivers of sustainable procurement (Figure 2), how to integrate sustainability into procurement policy and strategy, and how to organise the procurement function to support sustainability.

Applicable to both public and private sectors and scalable to the size of the organisation, ISO 20400 promotes mutually beneficial relationships among clients, suppliers, and other stakeholders. It is worth noting that ISO 20400 provides guidelines rather than requirements and is not intended for certification purposes.

Industry perceptions

In a recent snapshot poll conducted by CIHT,¹⁰ 100% of respondents agreed that our sector needs clarification on common procurement standards in relation to carbon reduction for all parties (clients, contractors, designers and suppliers). There was a consensus that this would support the industry to respond to the needs of our changing society and meet the government's net zero pledge. However, only one in three respondents felt confident they were familiar with current policy and legislation on carbon reduction in procurement. To drive engagement, understanding, and buy-in from industry players, policy and legislation will need to be supported by effective communications.

Recommendations

Comparing international learnings around creating legislation and policy to drive carbon reduction in procurement with the current status quo, we believe there are opportunities to explore. Consistency and scalability are key – policy and legislation must accommodate organisations of all sizes while driving standardisation wherever appropriate. We recommend:

- ✔ The adoption of agreed common standards for carbon management in procurement. PAS 2080 and ISO 20400 should be considered, as standards that are already available for the sector to be used.

- ✔ Consideration of the approach taken to mandating carbon reduction through procurement in the Netherlands (see Case study 1). Policies mandating adherence to process standards and/or providing for standardised measurements of the WLC of a design have the potential to accelerate the delivery of carbon reduction across the supply chain. It is worth noting that the current mandates apply only to large government contracts, thus there is a need for mandates and associated guidance to be introduced for a great number of other contracts dealing with highways and transport infrastructure.

- ✔ Proactive communication, training and knowledge exchange to support policy and legislation. While adopting common standards will go some way towards simplifying the context, the importance of gaining engagement, understanding, and buy-in from organisations across the industry should not be underestimated.

- ✔ Ongoing international engagement with governments, standards bodies and experts, to continue to share learnings and drive best practice based on experiences all over the world.

Applying legislative and policy levers to drive carbon reduction has the potential to accelerate the pace of reduction across our industry as we challenge ourselves to deliver ambitious requirements.

Carbon reduction will be driven from the leadership teams within central government, local authorities, client bodies, design teams, contractors, and their supply chains; the role of leadership is covered in more detail in Chapter 4.

We hope that carbon can emulate health and safety, reaching a context where ambitious outcomes are delivered as standard across the industry, where carbon reduction is embraced as a fundamental principle from concept to completion on every transportation project, and where transparent collaboration and knowledge sharing accelerate ongoing innovation and adoption.

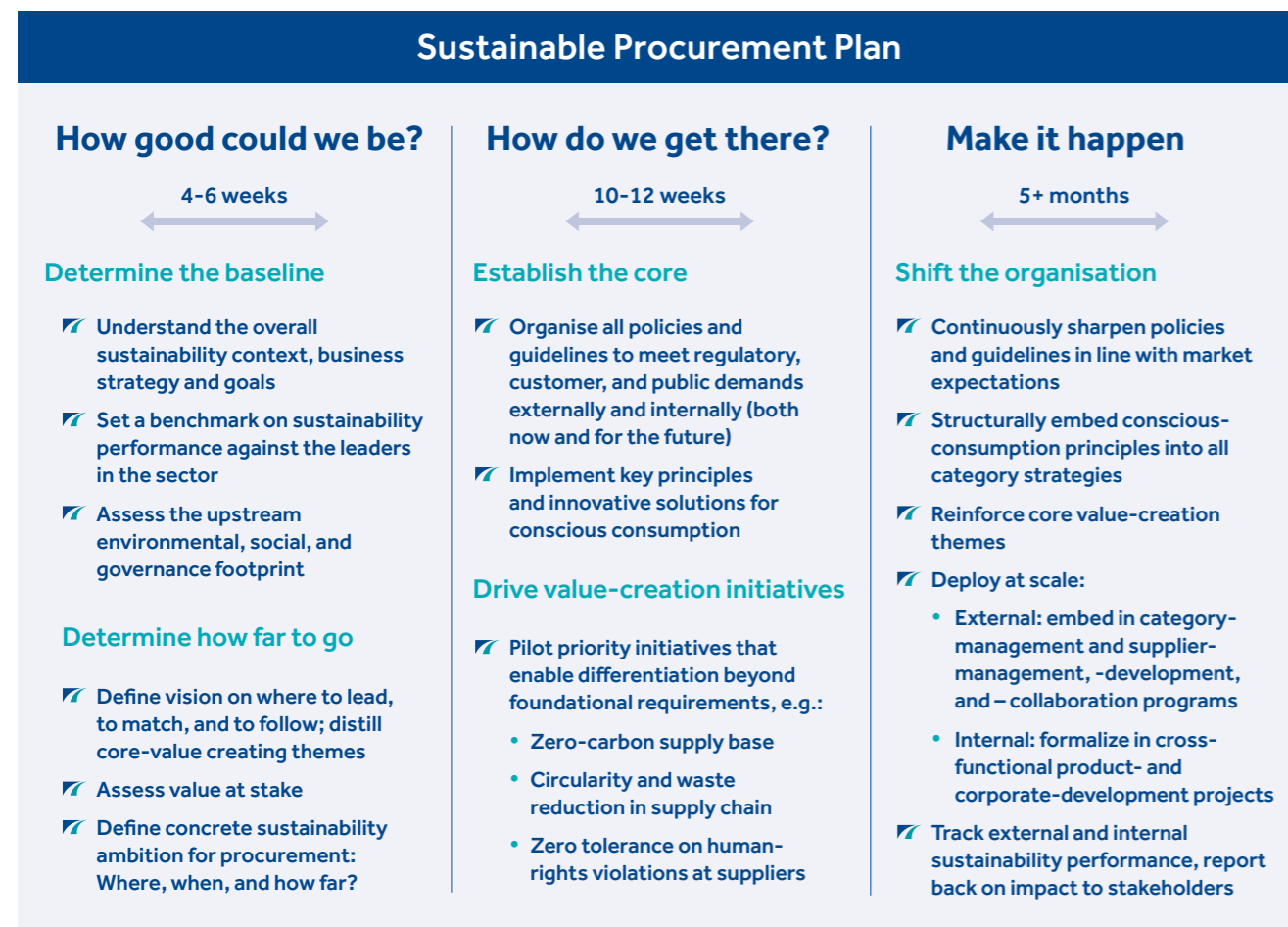


Figure 2: Sustainable procurement plan example (McKinsey & Company 2021).⁹

⁹ Image adopted from the table provided by McKinsey & Company (2021). URL: [Achieving sustainable procurement | McKinsey](https://www.mckinsey.com/industries/procurement/our-insights/achieving-sustainable-procurement)

¹⁰ CIHT Event 1: Building carbon reduction into procurement processes. 54 CIHT members and partners participated in the poll (18 May 2023).

Chapter 2: Contracts and supply chain

Traditionally, contract procurement has been predominantly concerned with factors such as time, cost and quality. However, in recent years we have witnessed a shift towards the recognised potential of contracts to generate social value. This shift has prompted industry consensus that contracts can also be instrumental in creating environmental value by reducing the embodied carbon within service provision. While there has been some focus on material selection, there are significant knowledge gaps when it comes to implementing strategies for reducing WLC in transportation and infrastructure.

Additionally, limitations arising from the service period of current contracts, coupled with hesitancy and reluctance to deviate from established models and approaches, have hindered progress in this area. This reluctance to introduce change is compounded by the current economic pressures on budget due to high inflation.

It is crucial to encourage everyone in the supply chain to look beyond these barriers and embrace more systemic improvements. This chapter aims to highlight the often-overlooked potential of contracts in achieving these goals, paving the way for a more sustainable and environmentally conscious approach to procurement.

Barriers to the sector

1. Gaps in knowledge, awareness and application

More than 75% of the 409 district, county, single-tier councils, and combined authorities have recently declared a climate emergency.¹¹ Collectively these local authorities have responsibilities under the Highways Act 1980 to manage over 97% of the UK's highway network. The highways and transportation industry has observed a desire by these and other commissioning members of the supply chain to incentivise the decarbonisation of project delivery in the sector.

To date, the sector has not established and embraced standard tools and training or built enough awareness of carbon reduction in procurement processes. This has created a hesitancy for individual organisations to take action and has resulted in a lack of internal investment to build the necessary capabilities to do so. When asked, 96% of CIHT members and partners polled¹² felt there is insufficient government support or knowledge to improve carbon reduction across the sector.

There are, however, examples of local authorities pushing boundaries using the NEC contract suite to tackle the challenge, but they appear to be doing so in isolation. Brighton and Hove City Council's Highways Services Contract (see Case study 2) provides such an example, where a local authority has used the X20 key performance indicator clause within the NEC4 framework contract to financially incentivise its supply chain to measure and reduce the carbon associated with its organisational and operational activities.

¹¹ Gudde, P., Oakes, J., Cochrane, P., Caldwell, N., & Bury, N. (2021). The role of UK local government in delivering on net zero carbon commitments: You've declared a Climate Emergency, so what's the plan?. Energy Policy, 154, 112245.

¹² CIHT Event 1: Building carbon reduction into procurement processes. 54 CIHT members and partners participated in the poll (18 May 2023).

Case study 2

Brighton and Hove City Council has recently renewed its Highways Services Contract, which now emphasises the council's ongoing commitment to be carbon neutral by 2030. This standard NEC4 framework contract has an initial contract period of four years with two, two-year optional extensions. Performance of the contract is specifically targeted against eight key outcomes, the first of which is carbon neutrality.

Successful suppliers are placed onto the framework, which requires them to deliver improved service levels throughout the lifetime of the contract while continuing to assist the council in meeting its carbon net zero 2030 commitment.

All suppliers are required to submit a Carbon Reduction Plan at tender stage that focuses on the recording and reporting of Scopes 1 and 2 emissions and additional reporting against the subset of Scope 3 emissions. The successful performance of the contract is routinely reviewed through the use of the more familiar secondary options (X20) and a number of key performance indicators (KPIs) specifically relating to carbon reduction, which have been included within the contract performance schedule.

These KPIs include:

- ✔ Delivery of the annual Carbon Reduction Plan (Scopes 1, 2, and 3).
- ✔ Delivery of the annual supplier's carbon emissions report detailing reductions achieved.
- ✔ Savings in tonnes of CO2 achieved for the previous period (reviewed quarterly).
- ✔ Proposed future carbon reduction projects.

The contract then uses a reward model, which was developed to reward the supplier for meeting or exceeding the targets set out in the various KPIs, resulting in an adjustment in the supplier's fees (for the previous accounting period) paid as a lump sum bonus.

Similarly, this model allows the client to penalise the supplier for not achieving levels of overall performance or meeting the client's carbon reduction commitments through a negative annual adjustment of the fees paid to the supplier.

This encourages the supplier to continually invest in meeting the client's carbon reduction commitments.

Following a period of consultation with the sector, NEC introduced its X29 climate change clause across its entire contract suite in July 2022. This aims to provide a contractual mechanism to incentivise behaviours that support carbon reduction when creating, operating, maintaining, or disposing of assets without the need to provide extended input into the scope. This secondary clause can be used to:

- ✔ Raise the profile of any content within the scope.
- ✔ Incentivise performance against climate change targets.
- ✔ Add to existing processes or create new ones that support the reduction of the impact of the works, service, and supply on climate change.

An example of where the clause has been used effectively is Somerset Council (see Case study 3). The organisation has recently put six highways and transportation contracts to market, utilising the X29 clause to incentivise its supply chain to help it meet its objective of being a carbon neutral county by 2030. When considering the procurement strategy, it decided not to dictate to the market what it wanted but instead collaborated with the appointed supplier to explore what was possible.

Nevertheless, 12 months after its release, there appears to be limited knowledge or use of the X29 clause. A cross-section of industry representatives could not find any other current examples of X29 in use by public-sector commissioning authorities.

Case study 3

Somerset Council has a clear ambition to drive carbon reduction but recognises that the profession does not yet have all the solutions, and shared responsibility between employer and suppliers will be vital to success. It has used the emerging NEC4 X29 climate change clause for construction contracts and adapted this as a Z clause for its professional services contracts. The contracts require submission of an initial climate change plan with the tender for each contract, demonstrating how a minimum 50% reduction in emissions will be achieved during the contract, and for this to be evolved collaboratively in contract.

Climate change quality questions are used in the quality assessment to enable suppliers to set out their initial proposals, and a climate change performance table sets out the climate change targets and associated penalties and rewards. The council has not set any penalty for failure to deliver the target since it wishes to avoid dispute and drive positive collaborative action. The council envisages that penalties and rewards can be introduced by mutual agreement during the contract term as carbon reduction practice matures.

Contractors are required to calculate baseline emissions at commencement and report progress annually. Highways tenders need to demonstrate ambition and current decarbonisation activity as part of the request to participate and also deliver an alternative fuelled fleet, with proposals optimised in a negotiation stage (using a competitive procedure with negotiation).

The professional services contract and Highways Term Maintenance Contract have just been awarded and among other things will deliver alternative low-carbon scheme designs as “business as usual”, examining WLC cost as part of value-for-money decisions.

The council is also setting up a collaborative board that will enable coordination of activity between the employer and the suppliers jointly and will focus on how coordinated works and use of materials and the like might lead to greater opportunity for carbon reduction.

2. Length of existing contract service periods

The service period of many highways contracts is designed to foster long-term partnerships between two or more organisations. Alongside creating the conditions for collaboration, this has the benefits of stimulating private-sector investment and providing access to additional knowledge, capacity, and capability. However, this can create a barrier to decarbonisation through contractual mechanisms as it means tender opportunities may still be several years away.

This raises the question of whether contract variations could be introduced to overcome this barrier, to align

the actions of the primary elements of the value chain processes more closely to the carbon reduction objectives of both parties. While this would present some risks and opportunities to the supply chain, it is important to note that any change to distribution may also cause changes to the commercial model. With inflation at 7.8% in the year to April 2023,¹³ there may be difficult trade-offs that must be quantified before such action can be considered viable. NEC states that “Parties, the Project Manager and the Supervisor must act in the spirit of mutual trust and collaboration”,¹⁴ and this needs to be established within contract mobilisation and matured through the operation phase to create the conditions required for such change to be considered.

In April 2021, the UK saw the introduction of Procurement Policy Note 06/21 by the Cabinet Office, which provided advice on how to take account of suppliers’ net zero Carbon Reduction Plans in the procurement of major government contracts by central government departments, their executive agencies, and non-departmental public bodies. This provided a statement of intent by the UK government that procurement could be used to assess a supplier’s commitment to achieving net zero by 2050 in the UK, by setting out the environmental management measures that it has in place and which will be in effect and utilised during the performance of a contract. While this procurement policy note provides guidance to only a proportion of the public sector, it does hint at the potential environmental value that could be unlocked through more robust reform, as we have seen with social value in public procurement in recent years. This would all contribute to the UK’s net zero obligations under the Climate Change Act.

For a procurement strategy to effectively influence the decarbonisation of project delivery, it needs to be supported by well-designed performance management. That requires long-term partnerships, around which contemporary highways and transportation contracts are built, to be leveraged to realise the necessary behaviours and risk management. Moreover, it needs to allow for both the identification and evaluation of carbon reduction initiatives and their long-term adoption into business as usual. For instance, the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) is now attempting to incorporate this at the system level for the UK’s local roads network through its Live Labs 2 programme.

Modifying payment options to facilitate carbon reduction

The potential benefits of the introduction of innovation into service provision are often tempered by the supply chain’s collective ability to manage the risks this presents. This can be particularly acute when considering mitigation of any additional costs related to carbon reduction initiatives that are introduced. This

is especially the case where new or unproven products or services are introduced mid-term. However, there are examples where contracts have been designed to overcome this barrier using modified payment options. This has been achieved through both direct modification of the main option clauses and the introduction of additional clauses.

Additional conditions of contracts are more commonly referred to as “Z clauses” and were originally envisaged by NEC as being used only “when absolutely necessary to accommodate special needs”. This highlights the caution that should be taken when considering using this method, to avoid introducing additional risks to the contract that could possibly undermine its effectiveness. It needs to be recognised that good practice will not come overnight. It is an iterative process that may start as steps in the right direction and finish as a step change in the way services are delivered.

In 2017, Dorset County Council (now Dorset Council) awarded its Highways Works Term Service Contract using the HMEP standard form of contract (see Case study 4). It took steps to modify the option C (target cost) clause so that gain elements contributed to a Partnership Fund that could be used to finance and manage risks relating to material trials, heighten testing regimes and provide new service provisions. Initiatives were presented to the contract’s strategic management board for consideration by both parties. This allowed the council to introduce and scale secondary construction materials and energy-reduced asphalts much earlier than most highway authorities. In line with the Construction Playbook, key performance indicators linked to the outcomes achieved through the introduction of these initiatives, incentivised their adoption and provided a means for the contractor to secure service period extensions.

When asked, 92% of CIHT members and partners polled¹⁵ agreed that such mechanisms would encourage them to adopt less carbon-intensive products and services. However, while there is a clear appetite to explore such options, it is essential to remember that they must be considered within the context of existing contracts and the relationships between involved organisations.

¹³ Office for National Statistics. Consumer price inflation, UK: April 2023.

¹⁴ Clause 10.2 of NEC4.

¹⁵ CIHT Event 1: Building carbon reduction into procurement processes. 54 CIHT members and partners participated in the poll (18 May 2023).

Case study 4

Dorset Council and Hanson Contracting have been delivering highway maintenance programmes through the Dorset Highways Works Term Service Contract (DHWTSC) since April 2017. The DHWTSC is an HMEP standard form of contract, which is based on a modified NEC3 TSC. The contract form and governance were designed to create an environment that incentivises behaviours that reduce the environmental impact of the service provision. This is achieved through contract KPIs, catalysing innovation through the supply chain working groups and funding innovation at the supply chain level through a modified option C payment mechanism.

This case study provides a tangible and repeatable example of contract design and governance that has resulted in measurable reductions in the environmental impact of project deliverables.

When option C payment is used, and share ranges of 90–100% are achieved, both the employer and contractor receive a 45% share, with the 10% balance contributing to a Partnership Fund. The Partnership Fund is held by the employer until each anniversary of the starting date and is then invested into the supply chain to fund and manage risks relating to material trials, testing regimes, and new service provision, as agreed by the partnership strategic board.

The contract operates under 11 KPIs that were designed by Dorset Council to deliver the desired outcomes for both parties to the contract. Alongside ongoing performance management, these are also used as part of the evaluation process when considering service period extensions. Two of these KPIs specifically relate to carbon reduction initiatives and have been designed to incentivise behaviours that inform operational activity. They provide a means of mitigating the risk of material trials presenting the illusion of progress without tangible improvements being sustained.

✔ **KPI 5a:** To measure the amount of material that is recycled into the highways network annually.

- This includes the recycled asphalt pavement content of asphaltic cements and the inclusion of secondary construction materials in products such as cement-bound granular material.

✔ **KPI 5b:** The amount of CO₂e that is produced per tonne of material laid on an annual basis.

When these KPIs are combined with the modified payment option, the contract presents a mechanism for incentivising and facilitating carbon reduction initiatives for the partnership. Both the risk and reward of doing so are shared equitably between the employer and contractor. This has allowed Dorset Council's carbon reduction ambitions to be translated from the works information into an operational reality, without outsourcing the entire requirement to the private sector.

Recommendations

The examples provided show how contracts can be designed to support the decarbonisation of project delivery in the transport sector. While they cannot do this in isolation, they provide mechanisms that commissioning authorities can use to shape markets to deliver different outcomes.

- ✔ For these benefits to be realised, there must be a willingness from the commissioning authority to design contracts and assess tenders with carbon reduction at the core. This requires weighing carbon reduction alongside traditional notions of financial cost, quality and social value, thus directly influencing the contract award.
- ✔ Metrics should be measurable and equitable in line with PAS 2080:2023 to allow a fair assessment across service providers.
- ✔ There are alternative approaches, some which focus on shared responsibility to minimise likelihood of dispute, and some which focus on incentivisation and targets. It will be interesting to track these different approaches as they mature and come back to any lessons learned in the future.

Many commissioning authorities find themselves grappling with how to realise their decarbonisation ambitions within an existing contract service period. While it presents risks that need to be carefully considered, the option remains to introduce mechanisms via contract variations that incentivise decarbonisation and facilitate the introduction of new products and services.

- ✔ For the contract to remain viable for all parties, the impact this has on the risk profile of the project needs to be reflected in the way risk is distributed across the supply chain. Contract administration also needs to evolve to reflect the revised priorities so that behavioural change can be introduced and sustained.

If market forces drive suppliers to decarbonise their services, they will respond by making suitable investments to facilitate the transition. As we have seen with social value and with health and safety in recent years, this is a crucial benefit to public–private partnerships. Over time the iterative development of these new service offerings will drive efficiencies, which, when coupled with raised demand, will reduce the price of the service.

- ✔ The second clause of the NEC contract suite is that “Parties, the project manager, and the supervisor must act in the spirit of mutual trust and collaboration”. Achieving this is a prerequisite to successfully decarbonising project delivery. If this is absent, then all members of the supply chain should prioritise achieving this before attempting to realise any other gains.
- ✔ An assessment of an organisation's alignment with the requirements of PAS 2080:2023 helps to support the organisations involved to enact the spirit of the NEC clause towards meaningful project decarbonisation.

As with all relationships, there are varying degrees of maturity and always room to grow. This is an area that this paper will return to in the leadership, culture and behaviour change, and education and training sections.

Government-funded intervention has the potential to force behavioural change in procurement, and the need for fully funded intervention should not be overlooked. This should not, however, stop commissioning authorities from changing the narrative around contract design and tender assessment to place greater importance on carbon reduction and environmental value. This is a shift that we have seen in society in recent years that is yet to manifest within contracting. The UK government's commitment to realise net zero by 2050 was one that was embraced by society, despite the challenges that it presents in sectors like transportation and highways. The question now is not whether change is needed; it is how and at what pace the transport sector will respond.

Chapter 3: Whole-life carbon (WLC)

Greenhouse gas (GHG) emissions, more commonly called carbon emissions, occur throughout the lifespan of a project or programme of work, all the way from inception through to design and operation, and finally to decommissioning. WLC encompasses capital carbon arising from an asset's manufacture and construction, operational carbon associated with emissions resulting from the operation of the asset, user carbon from use of the asset (such as car emissions on the road), and end-of-life emissions associated with decommissioning of the asset. The key impact points are the initial design stage, material selection, logistics, the method of operational delivery, and opportunities for reuse at the decommissioning stage. Taking all this into account, a WLC approach identifies the overall best combined opportunities for reducing lifetime emissions and helps avoid any unintended consequences of focusing on operational emissions alone.

The importance of decarbonising the infrastructure sector, especially for transport, cannot be overstated.

It is essential to understand, manage, and mitigate the carbon associated with a project's "whole life". As highlighted in PAS 2080:2023, the ability to influence WLC is greatest in the early stages of a project when the fewest elements are fixed. As decisions are made through the optioneering and design stages, it is more challenging to make changes to WLC. As the availability and quality of data increase, the targets and granularity of each assessment improve as well, meaning that an evolving approach to maximise carbon efficiencies is vital.

Procurement teams commonly have an in-depth reach into the supplier market, and knowledge of the latest sustainable materials and work methods being employed across the industry. The logistical framework that transports materials through each stage of the supply chain is also a critical consideration. An environment that encourages teamwork between specifiers, designers, and procurement teams can bring several knowledge areas together to identify the optimal decision outcome.

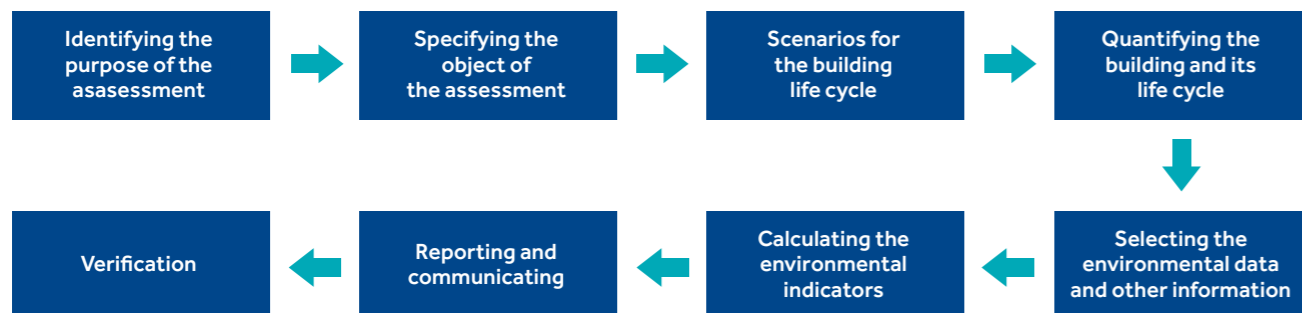


Figure 3: Steps for designing a whole-life carbon assessment.¹⁶

¹⁶ Source of the image: BRE Group (2018). Methodology for the environmental assessment of buildings using EN 15978:2011.

Existing standards and guidance

There are several key standards used for managing WLC on built environment projects. They are intended to promote reduced carbon, reduced cost delivery, and a culture of challenge across the value chain where innovation can be fostered:

- ✔ **PAS 2080:2023:** Carbon management in buildings and infrastructure; see the policy and legislation chapter of this paper.
- ✔ **EN 15978:** Sustainability of construction works. This standard was published by the European Committee for Standardisation in 2011. It defines a structure for a WLC assessment but lacks the notion of how this assessment should be conducted. Figure 3 provides an overview of several steps required to complete the necessary calculations:
- ✔ **EN 17472:2022:** Sustainability of construction works. This standard identifies specific requirements for assessing the economic, environmental, and social performance of engineering works by assessing their functionality and technical characteristics. The standard helps to support the decision making for a particular project by enabling comparison of scheme options.
- ✔ **EN 15804:2012 and A2:2019:** This is one of the most important standards that establishes the way companies should create Environmental Product Declarations (EPDs). The revised version of EN15804, published in 2019, includes several important changes. It covers all life-cycle stages, accounts for the benefits of recycling at the end-of-life stage, requires reporting on biogenic carbon that might require some additional data collection, includes additional environmental indicators, and encourages use of the International Reference Life Cycle Data System (ILCD) format to create national databases.
- ✔ **PAS 2050 and the GHG Protocol Product Standards:** Both standards define requirements for measuring the GHG impact over the product's lifetime and take consistent approaches to inclusion of biogenic carbon, recycling, delayed emissions, land use change and sector/product rules. However, there are a number of differences between these two standards, including the notion of recording for PAS 2050 and public reporting in the GHG Protocol Product Standards.

- ✔ There are other standards and frameworks in the sector that can be used, such as the Royal Institute of Chartered Surveyors (RICS) comprehensive guidance on WLC assessment for the built environment based on EN 15978 methodology.
- ✔ The Chartered Institute of Procurement and Supply provides qualified practitioners (MCIPS) with the training and tools to interrogate carbon emission sources and manage outcomes, using positional matrices/mapping, strategic alignment, supply enablement, market insights and supply response.

It is worth noting that the Department for Transport (DfT) has initiated a Carbon Management Programme and has adopted PAS 2080 as the main source of industry-standard guidance. The Carbon Management Programme incorporates capital carbon and is effective across the DfT's arm's length bodies, including Network Rail and National Highways. The DfT also seeks to reduce embodied emissions associated with transport and will be guided by the Industrial Decarbonisation Strategy.

Whole-life carbon assessment

The life-cycle stages required for a WLC assessment are shown in Figure 4. When assessing WLC, it is important to also understand the impact beyond the project boundary and, if possible, take into account the whole system. All WLC assessments for each life-cycle stage should use the best available data to guide decision making and ensure active management of emissions can be undertaken and tracked.

We believe that PAS 2080:2023 provides a comprehensive framework, but it should be used in conjunction with BS EN 15978 or BS EN 17472 regarding the assessment boundary rules. These are more specific standards and provide the level of rigour required to inform decision making. Asset owners should adopt this approach to drive consistency in scope and boundary rules, and it should be cascaded through the value chain.

Decision makers, at all organisational levels, should be provided with the necessary training and demonstrable capabilities to ensure optimal decision making. This should not be limited purely to clients and contracting organisations but cascaded to supply chain members through engagement and collaboration workshops and formal training channels.

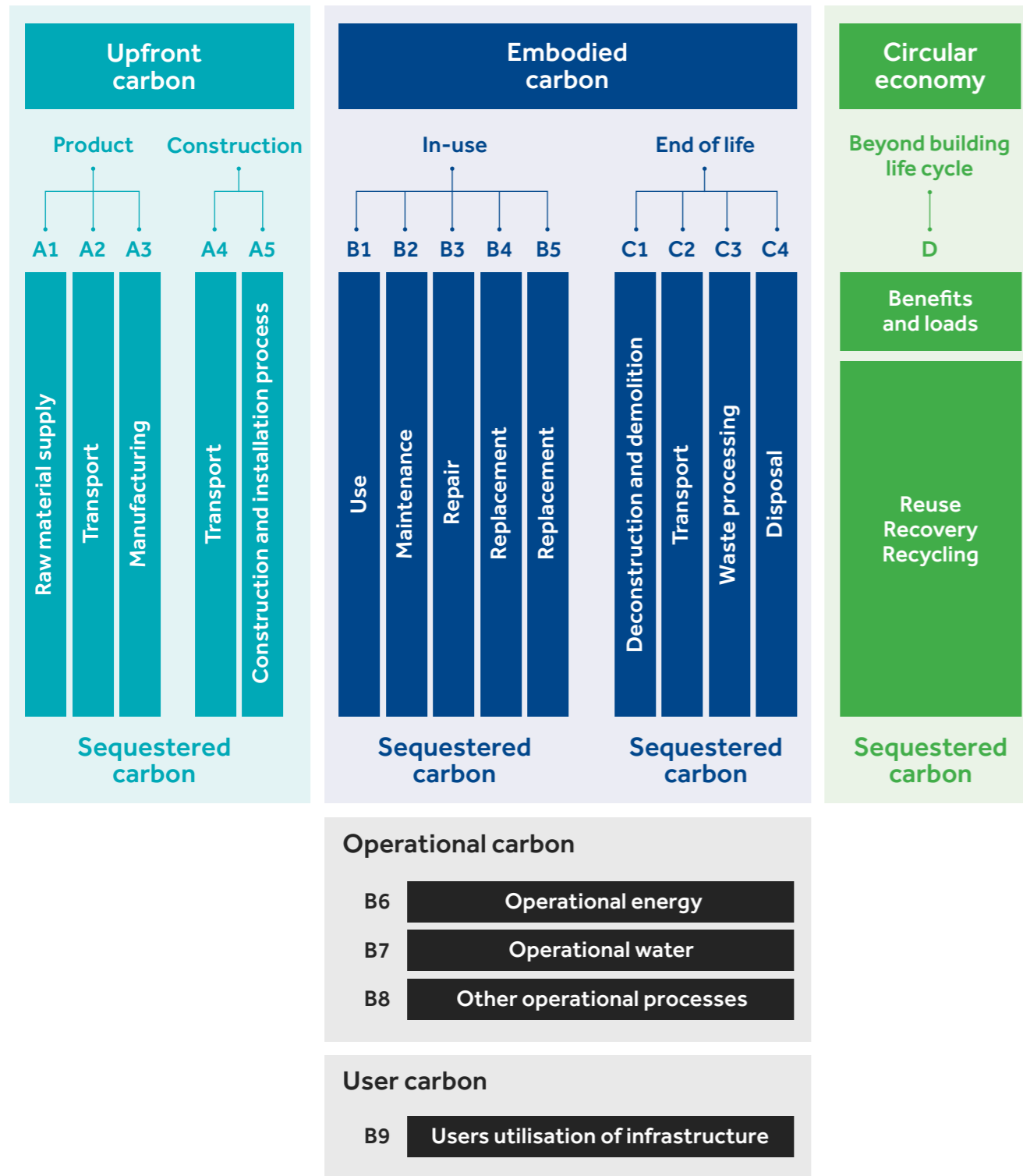


Figure 4: Life-cycle stages from BS EN 15978:2011 (for infrastructure).

Applying a value

The value of carbon must be clearly defined in how it is calculated and assessed. Currently, where WLC management processes are already in place, there is a lack of consistency, which means that individual organisations have different definitions of WLC management, making it difficult to compare. As a result, aligning practices for WLC management and building capabilities across all projects and programmes is critical to delivering net zero commitments.

Calculation methodology

Following EN 15978:2011, EN 17472:2022, and EN 15804:2012 ensures comprehensive and consistent WLC assessment methods and approaches for measuring, analysing, and reporting the WLC impacts of projects from a life-cycle perspective. These standards outline the scope, boundary setting, calculation rules, impact indicators, and data quality and quantity requirements for infrastructure and built environment projects and assets covering the whole life cycle. Asset owners should adhere to these WLC calculation standards, which should cascade through the value chain.

Carbon data requirements

There is a universal need for a consistent set of rules relating to data quality, reporting requirements and transparency for all assessments. This will drive data-based decision making, leading to a greater chance of decarbonisation being embedded across the project life cycle and driving continuous improvement on subsequent projects. Again EN 15978:2011 and EN 17472:2022 contain guidance on methods for carbon assessment, data requirements and calculation rules, following a life-cycle approach, which should be adopted. There is ongoing work to develop the Built Environment Carbon Database (BECD), which is designed to collect and supply product data by merging existing databases and available software solutions.

For bottom-up assessments and development of as-built benchmarks, EN 15804:2012 for EPDs should be

used where available; this standard provides information on WLC impacts of construction products and services that feed into asset construction. EPDs provide a standard approach for declaring the impacts of the manufacture and use of products through Lifecycle Assessments (LCAs). The Inventory of Carbon and Energy (ICE) database is also used widely and is a leading database for UK building materials. It covers the use of 300 materials across 30 categories. It is used in various bespoke calculators used by infrastructure asset owner organisations. Most of the data contained within the ICE database is compliant with BS EN 15804:2012 and is underpinned by EPDs.

Consistent metrics

Across WLC assessment standards and guidance, the standard metric for carbon measurement should be kgCO₂e or multiples thereof (e.g., tCO₂e). The RICS professional statement on WLC assessment for the built environment defines and recommends the functional unit that should be adopted for reporting WLC for specific types of built assets. For transport infrastructure such as bridges, roads and railway lines, kgCO₂e/km is often used, whereas for infrastructure transport hubs both kgCO₂e/passenger and kgCO₂e/m² NIA (Net Internal Area) are used.

Whole-life carbon tools

There are many tools available now for calculating carbon, but some of them concentrate on just the capital carbon, with very few able to carry out a WLC assessment. The ability to compare WLC assessments of different options and solutions across a project's life cycle is critical to driving low-carbon performance. The use of quantification tools to support the WLC management process can deliver significant benefits across the value chain. When correctly specified, quantification tools can unlock overarching challenges relating to consistency, transparency, decision usefulness of data, and continuous improvement. Some examples that are currently used in highways and transport are given in the following list, though it is worth noting that only a few of the freely available tools support WLC assessments:

✔ **National Highways Carbon Tool:** This was initially developed at the start of the first Road Investment Strategy (RIS 1) and emphasis on carbon emission reduction has continued in RIS 2. It has been developed as a tool for suppliers to National Highways to report on carbon returns. It should be noted that the National Highways Carbon Tool uses Microsoft Excel format, which presents limitations for the sharing of carbon data and establishing carbon benchmarks. The tool also does not support WLC assessment.

✔ **FHRG Carbon Analyser:** ADEPT, Atkins, Colas and Ringway have been working on the FHRG Carbon Analyser for the application of GHG Scopes 1 and 2 in local highway authorities. It includes academic input and analysis from Proving Services and the 10 local highway authority members that form the research group. The FHRG Carbon Analyser is being used for many of the ADEPT Live Labs 2 projects, and ADEPT is also working on guidance, which includes Scope 3 emissions.

✔ **Asphalt Pavement Embodied Carbon Tool (asPECT):** This is used to calculate the carbon footprint of asphalt used in highways and was most recently reviewed in 2020. It has been developed following the PAS 2050 specification. It is a joint initiative supported by National Highways, Mineral Products Association and Eurobitume, promoting an industry standard.

✔ **Supply Chain Sustainability School (SCSS):** SCSS aims to support supply chains in calculating their GHG emissions, as well as supporting clients to understand the carbon that is embedded in their supply chains. This provides an understanding of Scope 3 emissions. Furthermore, the school provides a comprehensive suite of training materials to upskill and inform practitioners about carbon management, at all levels (see more information in the education section).

Method of tendering and pricing

To deliver low-carbon outcomes using a WLC approach, it is critical that requirements are entrenched within procurement processes throughout their lifespan. This will ensure that low-carbon outcomes are considered at every stage of a project life cycle.

✔ Ensure the scope (e.g., design, specification) and the contract (X29 or similar incentives) align with the current legislation and allow for innovation. The ambition and requirements for decarbonisation would ideally be featured at all stages: the contract clauses, the contract scope and the evaluation process.

✔ Move away from the bill of quantities (BOQ) being just about the financial cost and instead move towards an approach where carbon emissions and carbon cost are equally well quantified and considered in the tender process (see Cross Tay Link Road example). Allow freedom in specifications (design life).

✔ Ensure tools to measure carbon weightings are available at cost estimation stage, to ensure a strong baseline approach to subsequent tracking and monitoring and a lessons-learned culture.

✔ Require bidders to show a demonstrable track record in delivery, research and innovation on decarbonisation, as part of their request to participate in a restricted tender process.

✔ Consider incentivisation mechanisms based on reduced carbon elements.

✔ Allow for potential lower-carbon methods, materials, etc. to scale by making it easier for people to procure them.

✔ Ensure carbon reduction and removal KPIs are present throughout the tender, contract and relationship management process and are linked to supplier performance reviews at critical stage gates.

Funding

Funding is a key lever in delivering projects and is a critical influencer on being able to implement WLC management within projects. At present, short-term capital costs are a significant driver for projects. Furthermore, long-term funding is not guaranteed in political cycles compounded by increasing maintenance backlogs, and this situation is pushing local roads to have similar investment windows to strategic roads (five years to plan and explore alternative solutions to traditional methods and materials). Local authorities

work within a short-term political environment, with regular changes to policy and strategy to contrast with previous administrations, which increases overall costs and limits the ability to enact change. There is a need to move away from a short-term funding approach and towards longer-term funding, providing a nimbler base to incorporate WLC management. It is worth noting that the higher cost associated with the lower-carbon solutions within major projects may currently adversely affect value for money. There is a need to explore opportunities within the HM Treasury Green Book to include value of carbon saved through WLC management, and for the government to develop an associated standard mechanism.

✔ Carbon reduction via novel materials and processes could mean doing less work as funding is limited or fixed; it might be a challenge to fit this into scenarios where road networks are already in poor condition.

✔ Investment now could save carbon in the whole life cycle. There is likely to be a positive correlation between carbon and cost benefits, with the exception being non-scaled innovations.

✔ Private finance initiative (PFI) or similar mechanisms that allow up-front investment should be reconsidered to ensure investment in networks and efficient whole-life management.

Education

Applying a consistent approach to changing procurement models and similar processes will be challenging, but is required to ensure that all parties in the supply chain are on a level playing field. Therefore, an industry-wide programme to educate clients, contractors, and suppliers is necessary and fundamental to ensure industry-wide adoption of WLC management. Education is key to understanding and to getting clients, contractors and other stakeholders working towards the same methodology and standards as others. Training allows information to be disseminated from top-level

decision makers down, including those working on site, which can promote a culture shift that supports confident decision making by leaders. This helps to drive a movement away from short-termism and policy myopia towards more long-term, strategic goals. It is important to ensure that carbon reduction is a cultural mindset within teams, not purely a tick-box exercise – it should be a consideration in the same way that project timings and cost management are.

It is noted that the best outcomes for decarbonisation depend on strong relations with the supply chain, and involvement of the supply chain across a workstream, as well as being supported by quality training and tools to deliver schemes that are carbon efficient. Sharing knowledge is key, and we have seen examples of this taking place across the industry, including the launch of a new research hub – the Net Zero Transport for a Resilient Future Hub – to improve transport resilience and achieve net zero, which was announced in early 2023 by Decarbonisation Minister Jesse Norman. Transport for London (TfL) is currently rolling out carbon literacy training to staff across the business. This will help to support colleagues to ask the right questions of contractors and to make informed decisions. This will support TfL to achieve net zero by 2030 and support the Mayor of London's ambitions for a net zero London by 2030.

The SCSS is another organisation seeking to expand understanding of carbon literacy in the UK. It is a collaboration between clients, contractors and suppliers, and aims to upskill those who seek to work or are already working in the built environment sector. The SCSS also enables users to track their knowledge development in each area, through use of radar graphs. This can be used as a measure within team members' skills development reviews, and to measure team knowledge levels as a whole. The CIHT team has also developed a course on carbon literacy¹⁷, aiming to provide insight on key terminology, relevant standards, and different estimation techniques and types of projects in the transport sector.

¹⁷ [Transport Decarbonisation - Introduction \(1 hour CPD\) | CIHT \(cihtlearn.org.uk\)](https://www.ciht.org.uk/transport-decarbonisation-introduction-1-hour-cpd/)

Examples

France – RE2020

The French Ministry of Ecological Transition has stated that the building sector represents more than 43% of the national energy consumption in France. RE2020 came into force on 1 January 2022 and implements a new regulatory framework on energy consumption. It places limits on how much energy a building is allowed to use on aspects such as primary energy consumption and heating. The scheme has been considered a success so far, in its short period of implementation, given that between February and April 2022 the number of building permits issued compared with the same period the year before rose by 16.4%. The regulatory framework considers all factors involved in the construction of buildings, focusing on building quality, renewable resources, and bio-based and local materials. Reduction targets will be set incrementally to support the aim of carbon neutrality by 2050, and these have been running since 2016 on a voluntary basis to build a database and to upskill the sector.

The approaches seen in France and the Netherlands have concentrated on the buildings, while the next examples consider major infrastructure projects, such as roads and bridges.

Perth, Scotland – Cross Tay Link Road

The Cross Tay Link Road, located near Perth in central Scotland, is an excellent example of where WLC management has been implemented since project inception. This has been driven by the local authority through the design stages of the project to ensure continued implementation of PAS 2080, representing a successful implementation of an industry standard. Three environmental questions were included in the invitation to tender, including seeking an approach to achieve a 30% reduction in the carbon footprint over the specimen design. Early contractor involvement provided an opportunity to optimise the design for carbon reduction, as well as to align procurement and construction methodologies. This included reducing the overall dimensions of the bridge spans, meaning that less concrete and steel will be needed, making the scheme more carbon efficient overall.

The Environment Agency

In the UK, the Environment Agency (EA) is at the forefront of prioritising an approach using and committing to the use of WLC assessments for all infrastructure projects, no matter the value. The present tool, ERIC¹⁸, provides an evaluation of the relative carbon impacts. The new Carbon and Cost Tool (CCT) - which the EA is currently transitioning to - provides a bottom-up assessment of the absolute carbon impacts of a project at the various business case stages. The CCT is designed to ensure that carbon impacts can be updated throughout a project life cycle. This approach is considered an example of good practice across the industry.

Recommendations

Ensure that carbon requirements are entrenched within procurement processes throughout their lifespan so that low-carbon outcomes are considered at every stage of a project life cycle. Where possible, net zero carbon targets should be set at system level and WLC targets at the network and project levels, aligned accordingly as set out in the requirements of Clause 8 of PAS 2080:2023.

The ability to influence WLC is greatest in the early stages of a project when the fewest elements are fixed, and there is a need for consistency across the sector.

- ✔ We are strongly in favour of providing consistent training across the sector in relation to the selection of optimal materials and optimal supply chains, in conjunction with efficient working practices.
- ✔ Ensuring standardisation of activities such as cost estimation, then providing carbon weightings for each element costed, can guarantee that carbon is considered during the tender selection and subsequent delivery process.
- ✔ We strongly recommend a move away from a short-term funding approach towards longer-term funding, such as five-year funding settlements for local authorities.
- ✔ There is also a need to expand the BOQ approach to include carbon emissions and value of carbon saved, which later can be considered in financial evaluation in a consistent way.
- ✔ We suggest using quantification tools that support the WLC management process to deliver significant benefits across the value chain.
- ✔ Stronger and more collaborative relationships among procurement practitioners, wider stakeholders and supply chains will result in higher levels of information sharing, specifically relating to embedded and emitted carbon.
- ✔ We recommend clarity and transparency in how the value of carbon is defined, calculated, and assessed. Asset owners should adhere to EN 15978:2011, EN 17472:2022 and EN 15804:2012 WLC calculation standards.
- ✔ We recommend the development of a consistent set of rules relating to data quality, reporting requirements, and transparency for all assessments for adoption by the sector, and an industry-wide programme to educate clients, contractors and suppliers to ensure industry-wide adoption of WLC management. Training allows information to be disseminated from top-level decision makers down, which can promote a culture shift that supports confident decision making by leaders.

¹⁸ Currently the ERIC tools encompass all the carbon tools used by the EA and its delivery partners in assessing the carbon of its infrastructure projects, it includes the Carbon Calculator, Carbon Modelling Tool, and the Carbon Budget Tool.

Chapter 4: The importance of culture and behaviour change, education and training, and leadership

The importance of embedding carbon reduction in the procurement process has become increasingly evident through the inclusion of a new clause dedicated to procurement in the updated PAS 2080:2023 (Carbon Management in Buildings and Infrastructure), with examples shared within the guidance document of what this looks like in practice. The revision to PAS 2080 also re-emphasises the importance of governance and leadership within organisations to embed carbon management across programmes and projects.

Every organisation will be at a different level of maturity with regard to embedding carbon within procurement, but there are key considerations that can provide valuable insights for successful adoption: culture and behavioural change; education and training; and leadership. As we strive to embed carbon reduction in our procurement processes, it is crucial that we appreciate the cultural and behavioural challenges that need to be overcome. We also require better understanding of the role of leadership and how true leaders can help us to embed carbon reduction centrally within our procurement processes. Recognition of the education and training that is needed to successfully embed carbon as a requirement within procurement will support the changes the sector needs to make and quicken the pace of change.

This chapter looks at each of these elements in turn. Firstly, it seeks to demonstrate culture and behaviour change, to position procurement where it can have an impact on decarbonisation. This is followed by a look at education and training requirements to successfully embed carbon in procurement. Following this, the chapter examines the role of leadership in developing the right culture and the fundamental actions that need to be taken. The chapter finishes with recommendations to ensure the right processes are in place within the organisation to embed carbon in procurement.

Culture and behaviour change

It is imperative that procurement is seen as strategic for it to have an impact; however, often the culture of an organisation does not support this. Procurement must have a voice at the table from the very inception of an outcome. Frequently departments are working in silos, not sharing information, and only involving procurement

at the end, meaning there is a loss of innovation as it is not built into the requirement or contract clauses.

The need to foster a culture of inquiry is critical to success, allowing for honest evaluation, discussion, and development of proposed ideas and changes. Investing extra time to improve the final design, without being pressurised by an end date, could be prudent to avoid a compromised project being delayed.

The sector has seen the culture around safety evolve from a cost consideration in the latter stages of planning and point of implementation to a priority concern during the strategic planning phase. There is an acceptance and encouragement that managing safety is part of everyone's role, being regarded as business as usual rather than a specialist area, and this is the precedent for how the culture and behaviours around reducing carbon need to develop.

Incentivising behaviours

Client organisations are in the unique position of being able to encourage behaviours that prioritise carbon reduction, through adapting existing mechanisms. There are several levers that can be applied, including both non-financial and financial. A few examples include:

- ✔ **Supplier recognition:** Rewarding suppliers who demonstrate leadership, whether publicly or among key audiences such as other suppliers, industry peers, and investors.
- ✔ **Supplier contracts:** Including requirements related to climate action in supplier codes of conduct or contracts that suppliers must agree with to maintain the business relationship.
- ✔ **Business benefits tied to performance:** Any measures that reward suppliers' decarbonisation performance with more work or preferential business terms, such as longer-term contracts or shorter payment terms.
- ✔ **Industry coalitions:** Forming an alliance with industry peers who share suppliers to motivate suppliers to set targets – the more customers signal that this is a priority, the more likely it is the supplier will take action.

Supplier selection should be weighted towards those with clear plans of action or demonstrably lower emissions. This embeds incentivisation into the supply chain by publishing what the organisation's ambitions are and formalises this over the lifetime of a contract. The ultimate goal is to see a pronounced change in the market once the results of achieving the decarbonisation milestones have been reported.

Breaking down silos and sharing risk

Removing silos means we can aggregate demand, create effective pipelines and increase our purchasing power. There should be a greater emphasis on supplier relationship management and working to build partnerships with suppliers so that opportunities for carbon reduction can be increased. It is worth ensuring that the benefits of the outcomes are tracked, and that this tracking is part of contract management, which should include tangible cost benefits and intangible benefits.

Many initiatives exist in "the house of risk", a regularly used paradigm in which the quality of outputs is examined alongside risk agents and their possible

repercussions. It is proposed that projects instead should reside in "the house of intervention", where the rule book is changed to meet what is really required to deal with risk agents.

Having an understanding and an honest recognition of risks, so that decisions may be made that reflect them, creates a culture of transparency. From this basis, collaboration, data sharing, and a fair governance structure to report against it, can be built.

Inclusive culture

A more diverse workforce would create an inclusive culture that looks beyond career development, empowers individuals and looks after their wellbeing. Inclusive culture is found in organisations that are innovative and responsive to consumer trends. The employees are comfortable to speak up and the organisation is transparent and collaborative, meaning silos are broken and the employees all have a shared vision. The transparency and collaboration are also extended to the supply chain and the public by disclosing carbon reduction targets, actual results and initiatives for continuous improvement.

Case study 5

By adopting and aligning with the UN Sustainable Development Goals, the facilities management and professional services company Mitie has:¹⁹

- ✔ Implemented shared governance and senior level oversight of the whole environment, sustainability, and governance programme. Directors must lead by example and promote the desired culture that makes the business the "destination employer" within their industry.
- ✔ Acted responsibly and shown the highest levels of ethical and moral stewardship, while providing transparent and public disclosure of materials, impacts, progress, and targets.

By encouraging responsible management, the business supports the creation of long-term sustainable value for shareholders, stakeholders, and contributions to the wider society.

Mitie's Social Value & Responsible Business Committee is set up to ensure the group conducts its business in a commercially responsible way. Representatives from across the business are included on the committee, which includes HR, Media Relations, Business Services, Care & Custody, Chief of Staff, General Counsel & Company Secretary, and Chief Government & Strategy Officer.

- ✔ Driven sustainable investment throughout the business and fostered and cultivated a culture of collaboration throughout the organisation and wider value chain.

Mitie recognises that it is a people business. It aims to ensure that all employees have good knowledge around climate issues and encourages its supply chain to align with its science-based target journey for reducing the impact created through the business on the environment.

¹⁹ Mitie (2022). Enhancing lives and assuring a better, more sustainable future. ESG report 2022. <https://www.mitie.com/wp-content/uploads/2022/10/ESG-Report-2022.pdf>

An important factor in the success of creating an inclusive, responsible culture is that everyone is aligned, from the board to junior employees. To that end, the board must monitor and assess the culture to define behaviours of its people and underpin its vision for sustainability. This helps embed social value and awareness and creates the behaviour and knowledge across the business and value chain.

Mission-led procurement

Missions are challenge-based, urgent, and strategic goals, which are being adopted more regularly by contracting authorities. They are designed to support transformation and innovation and they set public value priorities. The

urgent need to reduce carbon emissions can clearly be regarded as a mission, and there are examples of mission-led procurement that we can learn from.

The mission-led approach requires a range of both individual and organisational capabilities. Fundamentally, it needs everyone to see the wider strategic relevance in decisions and have a keen understanding of what the organisation is trying to achieve.

The case study evolved when Camden, in collaboration with University College London (UCL), recognised that its objectives needed to include a spotlight on sustainability, decarbonisation, and strengthening the community.

Case study 6

UCL Institute for Innovation and Public Purpose (IIPP), in conjunction with Camden London Borough Council, aims to develop a new framework for creating, nurturing, and evaluating public value in order to achieve economic growth that is more innovation-led, inclusive, and sustainable.

This framework is intended to inform the debate about the direction of economic growth and the use of mission-oriented policies to confront social and technological problems. The work will feed into innovation and industrial policy, financial reform, institutional change, and sustainable development.

The case study²⁰ identifies internal processes and governance of Camden's commissioning and procurement system that need to be adapted. Opportunities for change were identified at various points of the process. Key themes that emerged around mindset and culture, leadership, and learning were:

- ✔ Policy must support the change in mindset, to minimise risk while simplifying the process.
- ✔ A core part of embedding a new culture is to bring the procurement team into conversations about commissioning earlier, rather than waiting until the strategic goals have been set.
- ✔ Senior leaders recognised that investing in the team is a necessary step in moving towards a mission-led procurement approach.
- ✔ Creating a learning culture within the commissioning and procurement teams allows experimentation, reflection, and knowledge transfer after the procurement cycle.

Finally, organisations must accept that they hold responsibility for the delivery of an outcome. The infrastructure must be put in place to:

- ✔ Nurture a culture of collaboration to improve behaviours.
- ✔ Assess and explore what holds risk and the legal implications of that.
- ✔ Implement continuous improvement and capture lessons learned.

Education and training

Building up knowledge was raised as a key consideration in the WLC costing chapter of this report. This is also true more broadly. For many organisations across the sector, goals and measures for carbon reduction are relatively new and will require adjustments to be made to embed them as business as usual. It will be important to ensure that appropriate training and learning are developed and shared across the sector so that, with time, a broad knowledge base is available and embedding carbon in procurement becomes the norm. It is important to understand that training needs will vary for different roles and at different levels across the industry. This section highlights some of the key areas that should be considered to build and embed knowledge.

Role across industry

One issue faced across the sector is that a lack of consistency can make it difficult for the supply chain to respond to procurement questions. For example, some organisations may ask their suppliers to sign up to a science-based target, while others may ask them to sign up to the Pledge to Net Zero. Although these are very similar, it could be cumbersome for the supply chain to align to all initiatives.

There is a need to develop guidelines, tools, and training that help build capability across the industry so that there can be a consistent approach. Although there may be different initiatives, guidance can be produced to develop a standardised approach for collating climate information for tendering purposes. Training can be provided to ensure that organisations are asking the right questions and the supply chain has knowledge to provide the right answers. It should be established which organisations should take responsibility for developing examples, preparing guidelines, and providing training and support.

Training for leaders

While the leadership teams in organisations across the sector may not need specific knowledge on procurement mechanisms and how to embed carbon as a requirement, they must have an underpinning knowledge of how carbon and climate change impact their businesses and the role that procurement can play in reducing this, including the policy and legislative drivers that will affect their businesses. Building the carbon literacy of the leadership team is crucial in making sure that carbon reduction is embedded in decision making and the correct processes are in place throughout the organisation. Through training, leaders

can help to socialise the language of climate change accurately, through bringing the terminology into questions, conversations, and decisions to shape the culture for the sector.

Training for practitioners

Often with new initiatives and requests it can feel like extra work is being asked for but not necessarily valued. Training should be provided to procurement teams to instil the virtue of carbon reduction and why this is important from a climate perspective. While there are training modules that can be undertaken more broadly looking at sustainable procurement (e.g. courses provided by the SCSS, IEMA, and the United Nations through SDG:Learn), tailored training about embedding carbon requirements in procurement would be worthwhile. Developing a greater sense of purpose as to why carbon reduction is required will embed this as business as usual.

When asked what role CIHT could have in this area, our leaders stated that CIHT can influence training and skills to ensure that all those who are now working in the field have access to education and information. Through the research and preparation for this report, CIHT has been assessing the need for training, identifying gaps in the market, and understanding what information is required for those in procurement roles to build knowledge where this is required. Training for procurement teams should focus on how to embed carbon questions within tender documents, what realistic carbon reduction targets look like, and how to work with suppliers to break down barriers and incentivise low-carbon solutions.

Training for the supply chain

Although it might be relatively straightforward to add a question on carbon reduction within a procurement exercise or tender, this does not necessarily mean that the supply chain will be able to answer. It is important that guidance is shared, and time is given to work with manufacturers to enable them to collate the information required to answer such questions in procurement.

One challenge here is demand. As an example, in the energy sector in the UK, network operators are starting to embed carbon questions in procurement, but with a huge demand globally for these materials, manufacturers are concerned about having to record and collate the information required. Knowing that there are markets globally that will not be asking these questions makes it easier for them to follow the path of least resistance.

²⁰ UCL Institute for Innovation and Public Purpose (2023).

[Mission-led procurement: Early insights from exploratory work in Camden | UCL Institute for Innovation and Public Purpose - UCL - University College London](#)

Overcoming challenges like this by providing training and support across the supply chain, to emphasise the importance of embedding low-carbon solutions on our projects, is key to get full buy-in across the sector. In summary, the key principles for building knowledge in this area are:

- ✔ Developing standard processes, tools, and training programmes.
- ✔ Ensuring training is tailored to specific roles and responsibilities.
- ✔ Creating worked examples to demonstrate how carbon can be embedded in procurement.

The role of leadership

The role of leadership is crucial to the development of the right culture and nurturing of behaviours that create an environment to deliver the vision and strategic aims of any organisation.

Leaders have an important role in influencing the behaviour of individuals around them and in shaping the culture of the leadership team and the larger workforce. The way leaders engage with people and urge others to act is fundamental to excellent leadership. They should be open-minded and inclusive; communicative and consultative; inspiring and motivating; clear in their approach and confident in defending it; and create conditions that allow everyone to contribute to effective project delivery.

Leaders with impact demonstrate strong beliefs in the vision and provide clarity through instruction and their own actions.

CIHT asked three recognised leaders within the UK transport and infrastructure sector to share their thoughts on the following:

- ✔ What drives them to push for decarbonisation.
- ✔ What some of the fundamental actions are for establishing a strong base for decarbonisation-friendly behaviours and cultures.
- ✔ How they have brought about successful change to have a positive effect on their organisation’s culture.

Examples of strong drivers included “a deep sense of doing the right thing” and recognition of the responsibility our sector has, to making the model changes with a sense of urgency. Understanding their position of responsibility in “both informing policy but also enabling the industry to be in a position to respond” was another driver.

The climate crisis itself is recognised as the driver by leaders, as it “needs wholesale change across infrastructure” and presents the best “opportunity ... for people like us to make a real difference”.

When questioned about what can help to make changes that improve decarbonisation-friendly behaviours and cultures, leaders’ priorities highlighted that carbon literacy training for everyone is key, as is to communicate well the science about decarbonisation and what it is teaching us.

Figuring out “what can be done differently, every day” within our individual roles, including the “easy micro changes and much more ambitious change”, will help to lead to “good climate actions and to make better decisions with climate in mind”.

A culture of inquiry is seen as critical to be successful in implementing change, and we need to “be prepared to have constructively challenging dialogue ... prepared to question if the proposed solution is really going to make the degree of impact promised”.

“The role of science and engineering expertise in enabling the transition to net zero” is also seen by successful leaders as important, along with the need for leaders to “provide a clear direction of travel ... to build confidence for the industry to invest in new technologies and infrastructure [that is] required to make the transition”.

Leaders also recognise they need to “consistently push for change” and “a new approach begins with the innovators and early adopters”. As leaders deliver “powerful, simple, and clear messages”, which demonstrate the need to be receptive to new ideas and provide the space for unavoidable failures that bring lessons for advancement, a culture of transparency and honesty is built, and encouragement is given for innovation.



Figure 5: The word cloud from the CIHT event 1: Building carbon reduction into procurement processes, 18 May 2023.

CIHT asked three recognised leaders within the UK transport and infrastructure sector to share their thoughts on the following questions



Professor Sarah Sharples
Chief Scientific Adviser,
DfT



Professor Glenn Lyons
Professor of Future Mobility,
UWE, and Vice President of CIHT



Rachel Skinner CBE
Executive Director, WSP,
and a former President of ICE

What drives you to push your organisation (and others) to change and move ahead with decarbonisation?



DfT has a responsibility to meet legal obligations on net zero and climate change. The scientific evidence is clear that:

- a) the impact of climate change is real and
- b) transport emissions of CO2 are a key factor in the warming that contributes to climate change. The Transport Decarbonisation Plan published in 2021 articulates this commitment. This involves both informing policy, but also enabling the industry to be in a position to respond to the requirements.



A deep sense of doing the right thing – especially for those without the privilege of having lived for over half a century in the global north through the apparent good times of prosperity; for those without the privilege of thinking “I’ll hopefully have had a good innings before things get really bad” or “we’ll probably be OK where we are”. My youngest daughter is turning 12. My youngest son is eight. When they are my age, we will be in the late 2060s. When my first grandchild, who is due to be born in September, is 77 we will be entering a new century. It is possible the world could have warmed by between 2 and 4 degrees centigrade above pre-industrial times by then. Such change has been referred to as the stuff of nightmares.

The transport sector has, weighing heavy on its shoulders, responsibility to those without privilege. If you believe in the precautionary principle then pace of change as well as direction of change is paramount – there is no time to lose.



The climate crisis, put simply, is the defining existential challenge of our time. There is no bigger or more urgent driver.

Michael Rosen’s brilliant bear-hunting words are useful in understanding the need for action and change: “We can’t go over it. We can’t go under it. We’ve got to go through it.” Frankie the UN dinosaur is supremely articulate on our lack of logic in failing to face up to the climate challenge – if you haven’t seen him (her?) yet, take three minutes to watch on YouTube.²¹

In short, wandering half-asleep through the next decade, hoping that “it might not be that bad”, “others will fix it”, “there’s time” or “tech will save us” – or (worse) wilfully turning away and busying ourselves with a quest to find some magical small print marked “delete/defer/decline crisis” – is, in my view, irresponsible and dangerous. It is also the exact reason we’re in this mess.

But now let’s come to the exciting bit: what better opportunity could there possibly be for people like us to make a real difference?

This crisis needs wholesale change across all of infrastructure. We know that infrastructure, including transport, is crucial to our shared quality of life but in the 2020s this comes at far too high an environmental price. Our built environment and everyday lives are utterly reliant on carbon-intensive processes. In my year as ICE President through 2021, I talked about 70% of the world’s carbon emissions being created or enabled by infrastructure. During that year, the UN²² published an even higher figure: 79%.

These total emissions far exceed Earth’s ability to process them so every action and every change matters. Our task, as transport professionals, is to figure out how to tackle and shrink our pieces of this jigsaw as fast as we can, to make them compatible with a resilient, net zero future.

What can be done to encourage more players in the sector to make changes that will improve decarbonisation-friendly behaviours and culture?



Ensuring that there are no “pinch points” in the system. For example, in switch to EVs, we need to make sure that a holistic approach is taken to planning, distribution, production, and installation of chargepoints in parts of the grid where the supply is needed. For aviation and maritime, we need to ensure that different future fuels (e.g. sustainable liquid fuel, hydrogen) are produced and distributed safely and efficiently. This requires the alignment of demand with production.

Organisations like Active Travel England play a key part in individual behaviour to encourage switch from using cars for journeys to more active approaches.

²¹ UNDP (2022). Don’t choose extinction: Frankie the Dino takes New York. 28 September. <https://stories.undp.org/dont-choose-extinction-frankie-the-dino-takes-new-york>

²² Thacker, S. et al. (2021). Infrastructure for climate action. UNOPS, Copenhagen, Denmark. https://content.unops.org/publications/Infrastructure-for-climate-action_EN.pdf



Carbon literacy training in a world with airbrushed media, misinformation, and disinformation is key. My mother asked me a few days ago why eating meat was so bad for climate change. I felt illiterate in the face of her question. I knew it was bad and that it related to intensive farming and deforestation but didn't have the full explanation at my fingertips.

I've been convinced enough to have stopped eating meat altogether but what would convince her and others when we are made to think it's just magic that a wide range of meat keeps appearing nicely packaged in our supermarkets? I'm really proud that my oldest son who is professionally trained in the performing arts now runs his own carbon literacy training company and is also taking a master's degree in environmental governance. He is bringing science and communication together and this is what our sector needs more of. Allied to this we need to be prepared to have constructively challenging dialogue, being prepared to question whether or not what we are told is part of the solution really is, or at least really is going to make the degree of impact promised.



This question can be answered in six words: language, skills, and permission to act.

To create or recognise "good" climate action and to make better decisions with climate in mind, we have to speak its language. Not everyone has to be fully fluent or reach an expert skill level, but we must understand the detail where it matters to our roles. For any one of us to act, we need to (i) see the urgency and complexity of climate action and then (ii) figure out what we can do differently, every day. Everyone's action list will include a mix of easy, micro changes and much more ambitious change.

For those in leadership roles at any level, an easy step is to socialise the language of climate action (accurately!) to inspire and encourage teams. Taking time to reframe the usual questions, decisions, and conversation to include climate outcomes, both decarbonisation and resilience, is the key to culture change for our profession.

Most of us don't have significant decision-making or investment power but this is no excuse. Armed with the right climate language and skills, every one of us already has permission to weave in intelligent, informed climate thinking to our work, every day, often without adding cost or time. Armed with an understanding of PAS 2080 principles (a surprisingly readable BSI specification, along with its guidance document), we can all make a difference as climate-conscious planners, designers, constructors, and improvers of the built environment. We can take the very worst options off the table and promote better solutions for climate. If we're really clever, we will look for co-benefits too.

Where you feel your leadership has achieved a change in culture or behaviour, what was it that led to this success?



As Chief Scientific Advisor, highlighting the role of science and engineering expertise in enabling the transition to net zero is key. This includes informing the types of R&D programmes, both directly funded by DfT, and funded by industry or other funders such as UKRI. As DfT the provision of clear direction of travel, such as through the EV mandate, or documents such as the Clean Maritime Plan and Jet Zero strategy, are key to ensure that industry build confidence and are willing to invest in the new technologies and infrastructure required to make the transition.



Since we conceived of the approach a decade ago, I have been consistently pushing for change from transport planning in the paradigm of predict and provide towards "triple access planning" in the paradigm of "decide and provide". Think of the diffusion of innovation – new ideas take time to push through in the face of the incumbent regime and associated norms of practice and vested interest. A new approach begins with the innovators and early adopters – those prepared to go out on a limb and challenge the orthodoxy. Such trailblazers are needed for others to gain confidence and see precedents that persuade them to follow suit. Decide and provide is diffusing as a growing number of individuals and authorities come on board. It's vision-led, embraces uncertainty, and is access-focused instead of being forecast-led and transport-focused. "De-car"bonising our communities and society needs this alternative paradigm that lends greater weight to spatial planning and digital accessibility to support economic and social wellbeing. It has taken energy, conviction, patience, and persuasive storytelling to nurture belief that change in our planning approach is possible. Whether the change is fast enough and will lead to bold efforts to reduce carbon-intensive motorised mobility remains to be seen.



Without a shadow of a doubt, the climate leadership that I'm most proud of started in late 2020 with my presidency of the Institution of Civil Engineers, at the launch of my Shaping Zero film.²³ My quiet goal was to make an indelible mark on civil engineering and I knew that a powerful, simple, and clear message was the key.

I knew a few years earlier that I wanted to home in on a leadership theme of climate action for civil engineers, as it was a blindingly obvious topic. The point of no return happened in our kitchen when our eldest daughter, then nearly 11, came home from school in tears. A classmate had shared a short presentation on climate change and it had changed her world. I'd spent years saying that I loved working in engineering as it did so much good for the world, so she simply could not understand why people like me weren't doing anything about the climate crisis. She challenged me – and she was right.

After many hours spent planning, scripting – and endlessly rescripting! – and approaching contributors, the film came together. The breakthrough moment where I knew my climate message had landed was just a few hours after it went live, when a genuine deluge of incredible feedback started flooding in from all over the world.

The occasional piece of hate mail (yes, really) that I received over the months that followed, almost all from long-retired civil engineers and tinged with a trilogy of sexism, ageism, and climate denial (not always in that order), could have spoiled things. Unfortunately for them, I've always enjoyed being provocative, so I was pleased that I'd prompted such sharp reactions, as my message had clearly been heard and had touched a deep-rooted cultural nerve. This, of course, was exactly the point.

²³ Institution of Civil Engineers (ICE) (2020). Shaping zero – watch the film. 25 November. <https://www.ice.org.uk/news-and-insight/latest-ice-news/shaping-zero-watch-the-film>

What more do you feel institutions like CIHT should be doing to drive a change in leadership and culture around decarbonisation?



CIHT can help with joining up the consideration of vehicles and technologies with the physical infrastructure. They can also influence training and skills to ensure that all those who are now working in the field have access to education and information to help them to understand how the transport system is changing, and how they and their organisations will need to respond.



Addressing climate change calls for system change and change in the behaviours of individuals. It calls for speaking truth to power as well as confronting the uncomfortable truths associated with a need for a sector to change and rethink how it invests for the future. Climate change is not a trending topic that we can allow ourselves to grow tired of. It is the defining issue for our profession and the duration of our careers ahead. Professional membership bodies cannot be risk averse. Having difficult conversations is unavoidable if we want to see change in leadership and culture. Bodies such as CIHT need to be convenors of such conversations.

They need to be unafraid to bring challenge to government when it is called for. They should set expectations of their members in terms at least of becoming more carbon literate, thereby helping to ensure such literacy is taken through into their professional networks, debates, and business practices. There is an opportunity for CIHT to celebrate and amplify the achievements of individuals and individual organisations that lead by example. CIHT itself can lead by example, from the initiatives it prioritises to the engagement it undertakes on behalf of its members.



Institutions, including the CIHT, are key to clarity about the core climate agenda, defining what matters to those wanting to become – and remain – professionally skilled in their respective areas. They need to act as a clear and stable rallying point around which strong networks of practitioners can form, grow, and influence.

Upskilling and knowledge sharing for decarbonisation, though, should be collaborative. In my view, we should discourage every institution from creating its own bespoke approach and learning materials. This is not how we've created the best or fastest change for safety, quality, or diversity. I see a key role for the CIHT and others in signposting the leading edge, collaborating within and beyond the sector, while keeping its eyeliner up and actively looking for the next change.

To drive faster change, professional institutions could do more to bridge knowledge gaps and common points of misunderstanding. There is unnecessary carbon-led confusion between built environment professions right now. To take just one example, buildings professionals often say that 40% of carbon emissions are attributable to "the built environment", while the UN figure (above) is 79%. These seem completely different yet actually they are easy to untangle, once we understand that when a buildings professional says "built environment" they usually mean the buildings themselves, including construction materials and energy use in operation, while the UN language around "built environment" includes not only buildings but also the much wider infrastructure systems that support them, so transport and also water, waste, digital, and so on. Stripping away these points of confusion will help politicians, industry leaders, and technical professionals to home in on the right change, faster.

Reflections and recommendations

Where previous chapters have examined policy and legislation, contracts, and taking a whole-life approach to carbon management, this chapter has looked at the attributes and skills that are required to embed carbon management within procurement. To ensure organisations are embedding the right culture, leadership, and knowledge sharing we recommend that:

- Organisations foster a culture where discussion and development of ideas and change are welcomed, where silos can be broken down, and where an inclusive and aligned workforce are encouraged.

- Training is specific to the roles that need it and that a standardised approach to carbon in procurement is developed to support knowledge sharing.

- Leaders shape the culture of their organisations, driving change, and engage with individuals to embed carbon as a requirement in the procurement process.

By harnessing these attributes, we can develop a model where having carbon in procurement becomes the norm for organisations, the culture for innovation and improvement is set by the organisation's leaders, change is embraced and a knowledgeable workforce has the appropriate skills to fully maximise the power of procurement for carbon reduction.

Conclusion

We have a fantastic opportunity to align the ambitions of the public and private sectors in delivering net zero in the highways and transportation sectors.

On the topic of decarbonisation, we have political alignment, public expectation, and the focus of the public and private sectors within highways and transport, where we are seeing the success of a collaborative approach in the UK and other countries starting to deliver tangible outcomes. However, we are already a third of the way through the Decade of Change, with considerable reductions targeted for 2030, so we need to accelerate our collective efforts to deliver tangible outcomes.

Through this paper the project group examined: policy and legislation, contract mechanisms and supply chain, WLC assessment, and leadership, culture, behaviour, and education, with recommendations arising from each summarised as:

- ✔ **Funding mechanism:** Consideration by government is needed to provide longer-term funding, and mandating carbon reduction through procurement.
- ✔ **Policy and legislation:** Existing, strong policy needs to be consistently accepted and used across the sector. Stronger legislation is needed to support this.
- ✔ **Cultural and behavioural changes** are needed within the sector to create the environment that will allow for the necessary modal shift to speed up the pace of change.
- ✔ **Leadership:** Effective leadership at all levels – within government, within the sector, and within individual client organisations, suppliers, and contractors – is required to drive the changes and provide clarity of direction and vision.

- ✔ **Contractual:** The spirit of the NEC suite should be the bedrock of the sector's culture.
- ✔ **Whole-life carbon:** Procurement should be positioned as strategic and given a voice at the outset. Carbon requirements should be embedded within procurement, with a WLC management approach.
- ✔ **Carbon measurement:** Agreed common standards and methodologies are required for measuring carbon value and for carbon management in procurement.
- ✔ **Knowledge and training:** There is a need for provision and development of affordable and accessible training, for all sections and levels of the sector, to enable growth in awareness and knowledge and a standardised approach to carbon in procurement – developing consideration of carbon into decision making as the norm.

We have all seen how our sectors can transform when we align, focus, and collaborate. The changes witnessed in health, safety, and wellbeing as well as social value show us that delivering on the decarbonisation challenges can be achieved together.

With decarbonisation we are still in a transitional phase and therefore we view this policy review as the start of a longer conversation and journey for the sector.

We look forward to engaging with the profession to examine these issues in more detail as we move forward together.

Appendix

Table A1: International case studies for Chapter 1

The Netherlands²⁴



Overview

The first country in Europe to have a formalised process of sustainable procurement. In 2010 the Dutch House of Commons stated that all public authorities must implement 100% sustainable procurement by 2015. Rijkswaterstaat developed a standard methodology for infrastructure projects where the functional specification of the tender and the quality input from the client together guarantee a high-quality and innovative solution. The government encourages soft law policies for carbon reduction (such as green deals for private and public actors to form coalitions).²⁵

Measurements (mandated for all tenderers):

- ✔ The CO2 performance ladder certification system (which enables a tenderer to show the measures to be taken to limit CO2 emissions within the different steps in the supply chain).
- ✔ DuboCalc (a life-cycle analysis that calculates the sustainability value of a specific design according to the materials). The DuboCalc score of the preferred design is submitted in the final document with the tender price.

Details / Case studies

Case study: A12, Netherlands (Rijkswaterstaat used the MEAT approach, which enabled the selection of the bid that offered the best ratio of price to quality including the assessment of CO2 mitigation and reduction of environmental impacts).

Lessons

- ✔ Carbon emission reductions were achieved through design and material choices.
- ✔ Optimising product lifetime led to greater whole embodied carbon benefits than the standard practice.
- ✔ Setting targets for environmental performance assisted in embedding carbon reductions in the early stages of the project (particularly crucial when considering long-term contracts that include in-use management, maintenance, and disposal of assets or infrastructure).

Key messages:

- ✔ A collaborative approach between suppliers and procurers is vital.
- ✔ The knowledge, behaviours, skills, and mindsets of the entire workforce play a significant role in achieving decarbonisation as they are collectively responsible for identifying and evaluating options, managing procurement, and delivering the final solutions.
- ✔ Business models driving procurement must also include the evaluation of carbon and other environmental impacts in addition to standard whole-life cost.
- ✔ Feedback from the interviews carried out during the project shows that carbon prices, as of now, are not high enough to drive the procurement of lower-carbon solutions.

²⁴ KPIARC. (2022). Carbon Neutrality of the Road Sector. A PIARC Special Project.

²⁵ Lingegård, S., Olsson, J. A., Kadefors, A., & Uppenberg, S. (2021). Sustainable public procurement in large infrastructure projects – policy implementation for carbon emission reductions. Sustainability, 13(20), 11182.

The United States²⁶



Overview

At the regional level, all public authorities that work on infrastructural procurement were obliged under the 2017 Buy Clean California Act to request the necessary EPDs from all suppliers and contractors of mineral wool, glass, and steel.

Details / Case studies

Case study: California High Speed Rail

The goal is to reduce the carbon footprint beyond the requirements. The California High Speed Rail team worked with generic EPDs because the product-specific ones could exclude small and medium suppliers.

Challenges

- ✔ Contractors were asked to elaborate a carbon baseline and reduce carbon emissions, but there were no penalties, rewards, and targets.
- ✔ Even though requirements worked well on the initial stages, over time, sustainability requirements lost in importance (contractors were asked to prepare sustainability plans by

themselves and report measures, reductions, and final data). It was also harder to find enough resources to have an alignment within the organisation due to the growing distance between the authority and existing projects.

Lessons

- ✔ The strategy's main point was not to exclude small and medium suppliers.
- ✔ The strongest side was to use existing standards (some of them in combination) rather than creating new ones.
- ✔ Essential to clarify the sustainability requirements to suppliers but also within the authority.
- ✔ Providing support and training were vital parts of promoting sustainability goals across different public transport projects.
- ✔ Need for an ambitious government policy to justify carbon reduction requirements.

Australia²⁷



Overview

Transport for New South Wales has defined a set of sustainable design guidelines. The client has an authority to set a level of reduction (usually 15–25%) in relation to the baseline.

Details / Case studies

Case studies: Newcastle Light Rail Project, Sydney Metro Project

(ambitions are even higher, aiming to become a global role model).²⁸

Challenges

- ✔ No clear bonuses or penalties in terms of fulfilling or failing the rating requirements.
- ✔ Not enough time in the tendering process to evaluate the concrete materials, and the absence of necessary information made the awarding system less useful.

- ✔ Even though functional CO2 reduction was in rating schemes, there were no penalties in case of non-compliance with the requirements.
- ✔ Most of the baselines are not appropriate because they reflect only the worst-case scenario.
- ✔ Carbon reduction practices in infrastructure are primarily driven by individual state agencies.

Lessons

- ✔ Providing support and training were vital parts of promoting sustainability goals across different public transport projects.
- ✔ Need for an ambitious government policy to justify carbon reduction requirements.²⁹

²⁶ Kadefors, A., Lingegård, S., Uppenberg, S., Alkan-Olsson, J., & Balian, D. (2021). Designing and implementing procurement requirements for carbon reduction in infrastructure construction—international overview and experiences. *Journal of Environmental Planning and Management*, 64(4), 611–634.

²⁷ Kadefors, A., Lingegård, S., Uppenberg, S., Alkan-Olsson, J., & Balian, D. (2021). Designing and implementing procurement requirements for carbon reduction in infrastructure construction—international overview and experiences. *Journal of Environmental Planning and Management*, 64(4), 611–634.

²⁸ Lingegård, S., Olsson, J. A., Kadefors, A., & Uppenberg, S. (2021). Sustainable public procurement in large infrastructure projects—policy implementation for carbon emission reductions. *Sustainability*, 13(20), 11182.

²⁹ Lingegård, S., Olsson, J. A., Kadefors, A., & Uppenberg, S. (2021). Sustainable public procurement in large infrastructure projects—policy implementation for carbon emission reductions. *Sustainability*, 13(20), 11182.

Sweden³⁰



Overview

In 2016, the Swedish Transport Administration defined carbon reduction requirements for all projects exceeding the value of 5 million euros. Measurements:

- ✔ **Klimatkalkyl (calculation tool):** If targets are met or even exceeded then the contractor receives an award of roughly 1% of the contract sum.

The industry generally had a positive attitude towards the Klimatkalkyl measurement due to its fit into the broader government initiative to create carbon reduction sectoral roadmaps.

Challenges

- ✔ The absence of clear guidelines or specific training on the topic of planning and design both for the supply chain and client representatives.
- ✔ Reduction targets and bonuses at early stages of the policy implementation were so low that contractors could easily receive full bonus via traditional design optimisation to save costs. Also, due to low requirements there were no financial incentives to further reduce carbon emissions.³¹

- ✔ The implemented baseline was fictive and did not include current practice, thus many actors questioned its legitimacy.
- ✔ The focus was shifted towards calculation issues rather than real actions for carbon footprint reduction. Suppliers of low-carbon products stated no increasing demand for their products from contractors in any of the infrastructure projects.

Lessons

- ✔ Requirements should be more specific for contractors and consultants to be able to make realistic resource estimations to implement requirements and adjust them in the tender.
- ✔ Need for greater support and knowledge exchange on how those carbon reduction measures should fit into current practices.
- ✔ The client should show leadership and interest in giving instructions on what should be prioritised and push for necessary changes.
- ✔ Need for up-to-date dialogue between the client and the industry.

³⁰ Kadefors, A., Lingegård, S., Uppenberg, S., Alkan-Olsson, J., & Balian, D. (2021). Designing and implementing procurement requirements for carbon reduction in infrastructure construction—international overview and experiences. *Journal of Environmental Planning and Management*, 64(4), 611–634.

³¹ Lingegård, S., Olsson, J. A., Kadefors, A., & Uppenberg, S. (2021). Sustainable public procurement in large infrastructure projects—policy implementation for carbon emission reductions. *Sustainability*, 13(20), 11182.

New Zealand³²



Overview

New Zealand is a latecomer in welcoming carbon reduction procurement requirements. The Ministry of Transport and the Ministry of Business, Innovation, and Employment adopted zero-carbon procurement policies in terms of capital investment. The New Zealand government published procurement requirements to decrease carbon emissions in construction and the built environment in 2021.

Tools: Life-Cycle Assessment Tools (to evaluate the whole-of-life embodied CO2 emissions), Green Star (to define reduction strategies in the built environment), Carbon EMS (shows the total amount of energy and operational carbon figures of the building).

Challenges

- ✔ Construction stakeholders that were part of the procurement process stated that there was lack of information regarding the most current zero-carbon initiatives as well as unclear government policies, guidelines, and educational programme.
- ✔ Ambitious procurement requirements and guidelines.

- ✔ The guide published by the government does not include any practical examples in terms of reducing carbon footprint.
- ✔ There is limited data on how the construction sector has altered daily practices to include carbon reduction strategies to evaluate the progress.
- ✔ No agreed standard for tender documents (varied across organisations).
- ✔ No specific measurements or criteria for evaluating carbon performance were defined.

Lessons

- ✔ Urgent need for comprehensive guidelines or education on CO2 evaluation criteria for professionals engaging in procurement processes.
- ✔ Need for comprehensive and improved tender documents (for instance, adding a clarification section on costs associated with integration of carbon assessment practices).
- ✔ Need for further innovation in the construction procurement activities as well as significant changes in management, design, and construction practices in alignment with the government requirements.

³² He, P., Bui, T. T. P., Shahzad, W., Wilkinson, S., & Domingo, N. (2022). Towards Effective Implementation of Carbon Reduction Strategies in Construction Procurement: A Case Study of New Zealand. *Buildings*, 12(10), 1570.

About CIHT

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- ✔ **Address the challenges of climate change**
- ✔ **Support the economy**
- ✔ **Help address societal inequalities**
- ✔ **Reduce environmental degradation**
- ✔ **Respond to a changing world**

We bring members together to share, learn, and feel confident about addressing these challenges through the application of good practice, by embracing innovation and by acting with integrity. It is through this and the values that CIHT can demonstrate and deliver on thought leadership and shaping the highways and transportation sector for the public benefit.

Whether you are a student, apprentice, work in the private or public sectors or are a company director, CIHT has a place for you and a commitment to fulfilling your professional development needs throughout your career.

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