

Carbon Reduction and PAS 2080 Demystified

A how-to guide for SMEs in civil engineering

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Civil Engineering Contractors Association

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Foreword

The UK has an ambitious target to become Net Zero by 2050, with an interim target of an 81% reduction by 2035 on a 1990 baseline.

To achieve this target, all parts of the economy will need to decarbonise at pace and at scale. The infrastructure sector is no exception to this and whilst this will require significant action to be taken by the largest players in the supply chain, there are thousands of SME businesses that will need to play their part too.

Realising this, CECA has developed free-to-access resources to help guide our SME members on their carbon reduction journeys: ***Carbon Reduction and PAS 2080 Demystified for SMEs in Civil Engineering***, which includes an introductory report and more detailed how-to guide.

The resources are intended to support our members in their journey towards alignment with, or attaining the PAS 2080 Carbon Management in Infrastructure standard, which is one of the key system tools available to civil engineering contractors for driving sector decarbonisation.

Many resources have been made available to help organisations with understanding their role around carbon reduction, but we feel that these resources, written by a mixture of main and sub-contractor members of the CECA Environmental Sustainability Group, provide specific awareness, advice, and examples of good practice that may be helpful.

We hope that they enable our members to turn the dial on addressing the decarbonisation challenge, which, put simply, is the challenge of our generation.

Ben Goodwin

Director of Policy and Public Affairs – CECA Policy





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How to use this document

To help civil engineering SMEs on their carbon reduction journey, CECA have produced two documents in the Carbon Reduction and PAS 2080 Demystified for SMEs in Civil Engineering series, an Introduction and a How-to Guide.

The first document in the series **'Carbon Reduction and PAS 2080 Demystified – An introduction for SMEs in civil engineering'**, provides information on climate change and carbon, the impact of carbon on the construction industry, the role of the SME, and the relationship between cost and carbon. It then goes on to provide simple explanations of key concepts and definitions relating to climate change and carbon reduction.

This document, **'Carbon Reduction and PAS 2080 Demystified – A how to-guide for SMEs in civil engineering'** leads civil engineering SMEs through the process of their carbon reduction journey and includes case studies, examples, supporting tools and documents. It supports certification to, or alignment with, PAS 2080 Carbon Management in Buildings and Infrastructure.

- PAS 2080 guides the management of carbon across the lifecycle of buildings and infrastructure
- It emphasises early collaboration, defined roles, and integrated decision-making for sustainability
- Implementing PAS 2080 can lower project costs, emissions, and enhance tender competitiveness
- Using it shows commitment to decarbonising the built environment and effective carbon management



The CECA Environmental Sustainability Group supports members through the following activities:

- Liaising and collaborating with other relevant bodies, in particular regulators (including the Environment Agency and Natural England), and providing feedback and formal review of guidance and issues that may affect the Construction Industry
- Fostering collaboration and sharing of best practices among members and stakeholders
- Reviewing all matters concerning the environment including environmental sustainability relating to civil engineering and the construction industry in the UK to identify and address key challenges, opportunities and the trends affecting the sector

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Section 1 – Carbon Management and Implementing PAS 2080

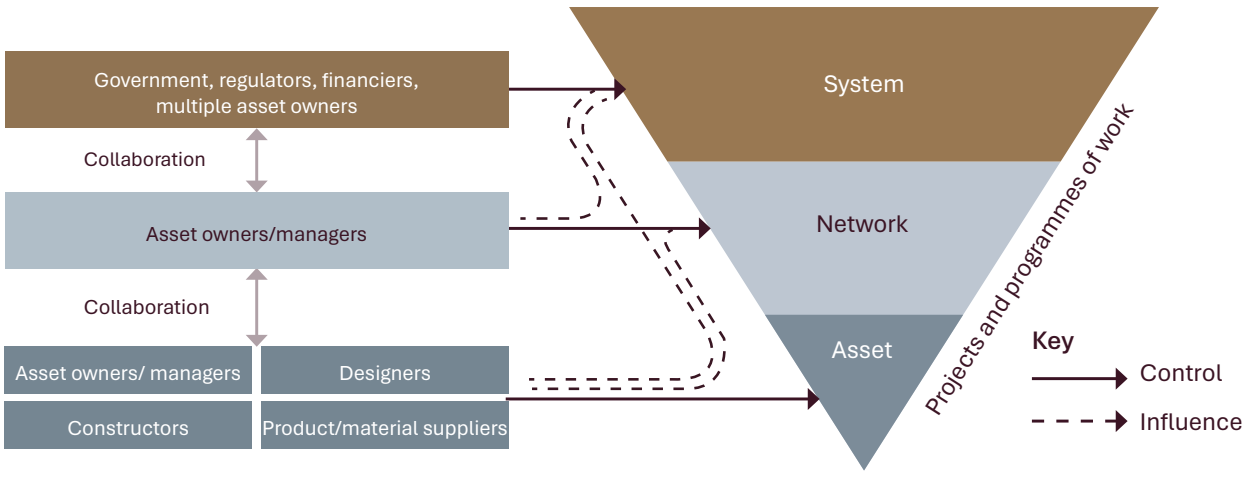
1.1 – Introduction to PAS 2080

PAS 2080 (PAS stands for Publicly Available Specification) is a carbon management standard for construction projects and can be applied to both the infrastructure and building sectors. It was developed in response to the 2013 UK Government Infrastructure Carbon Review and updated in 2023. The original 2016 version focused on infrastructure, whereas the 2023 version extends the scope to include the rest of the built environment too. At its core, PAS 2080 sets out how whole-life carbon should be managed throughout the entire lifecycle of an asset, and provides advice, guidance, and requirements for all value chain members.

PAS 2080 does not set out actual carbon reduction measures, and nor is it a list of low-carbon technologies or solutions which can be applied to a construction project to reduce its carbon impacts. Instead, it is a management standard that defines how different value chain members should work collaboratively to identify, assess, and report on low-carbon opportunities across the lifecycle of the asset.

The 2023 edition also emphasises the importance of 'systems thinking', which means considering the interconnectedness of different parts of the built environment and how they impact overall carbon emissions, and 'whole life carbon', which means considering emissions from design,

Figure 1: Roles of different value chain members in the built environment.



NOTE A building or infrastructure asset is part of a network, which in turn is part of a system. The control of decision-making sits with different members of the value chain, but some of them often have greater ability to influence decarbonisation, depending on the level at which they are operating.

construction, use, and end-of-life of assets. This helps to avoid 'burden shifting' where actions taken to reduce emissions in one phase of a project might inadvertently increase them elsewhere.

PAS 2080 defines actions for the four principal value chain members: asset owner, designer, constructor, and product/material supplier. SME organisations often act as the constructor, sometimes alongside a principal contractor. It helps to identify how collaboration between different value chain members at various stages of the project will support the successful delivery of low-carbon solutions. It also requires learning to be captured and applied to the approach for the next project.

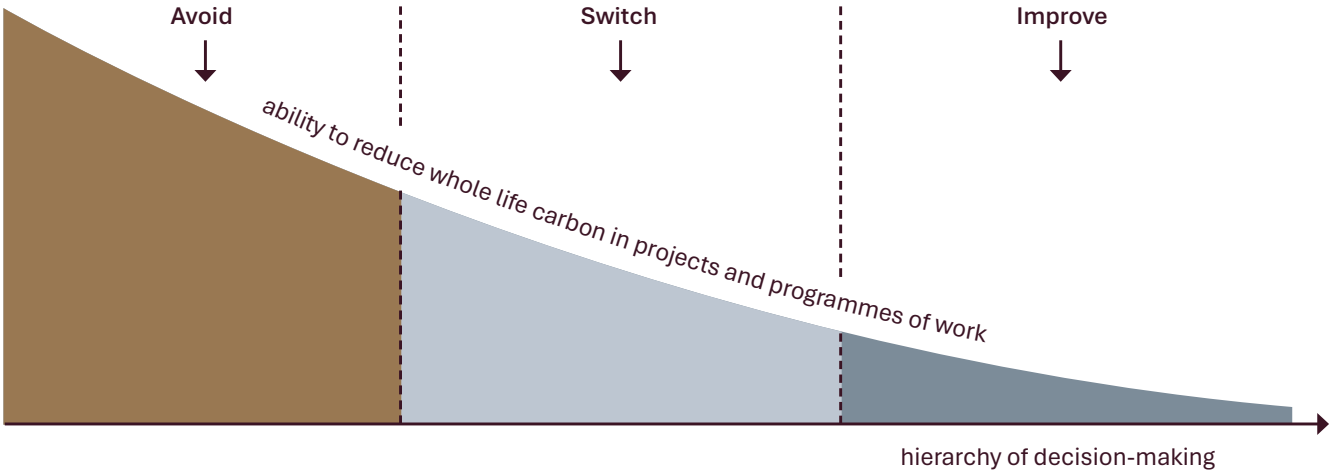
PAS 2080 defines a Carbon Reduction Hierarchy, which prioritises actions that challenge the need for new construction by considering whether the requirement can be 'Avoided' or delivered through the repurposing of assets. If building is necessary, 'Switching' solutions can reduce emissions using low-carbon materials, innovative design approaches or technologies that minimise operational carbon. Finally, the Carbon Reduction Hierarchy encourages design 'Improvements' which drive efficiency through increased asset lifespan, optimising resource use or applying circular economy principles.

1.2 – PAS 2080 Requirements

PAS 2080 includes requirements for value chain members to show leadership and establish effective governance systems for reducing whole life carbon through a carbon management process. The individual value chain requirements in the carbon management process are structured around the following components:

- Setting whole life carbon reduction targets
- Determining baselines against which to assess carbon reduction performance
- Applying the carbon reduction hierarchy
- Integrating carbon management into procurement
- Establishing metrics e.g. Key Performance Indicators (KPIs) for credible carbon emissions quantification and reporting
- Selecting appropriate whole life carbon assessment methodologies (to include defining boundaries and cut off rules)
- Capturing and reporting (including regular meetings) at appropriate stages in the infrastructure work stages to enable visibility of performance. This could include carbon reporting during construction on items such as material use, fuel use, vehicle movements, waste and electricity
- Continual improvement of carbon management and performance.

Figure 2: *The PAS 2080 Hierarchy.*



NOTE This figure represents a simplified and streamlined version of the carbon reduction hierarchy presented in PAS 2080:2016 and the Infrastructure carbon review. It has been updated to clarify its applicability and relevance to a wider range of projects and programmes within the built environment (i.e. to clarify that the carbon reduction hierarchy is not solely about new builds).

1.3 - What PAS 2080 means for CECA members

PAS 2080 is an important document that provides an opportunity for CECA members to engage earlier in construction projects. To deliver PAS 2080, asset owners, designers, main contractors, and also subcontractors/SMEs, and suppliers need to identify and assess low-carbon opportunities for the project which requires the skill set and experience of companies from across the industry.

For CECA members, this means playing a more active role in shaping solutions rather than simply responding to a finished design. PAS 2080 encourages open discussion on buildability, material choices, construction methods, and opportunities to avoid or reduce emissions from the outset. It enables contractors and SMEs to demonstrate their expertise, innovate and influence decisions at the point where carbon reduction is most achievable and most cost-effective.

Importantly, PAS 2080 recognises that contractors and suppliers are essential partners in finding practical, lower-carbon alternatives. CECA members are therefore expected to contribute ideas, provide accurate carbon related information, and collaborate with clients and designers to embed low-carbon thinking throughout the project. For many SMEs this offers a chance to differentiate themselves, improve competitiveness and build stronger relationships with the value chain.

1.4 - What does it mean to work on a PAS 2080 project?

Awareness of what is required

Working on a PAS 2080 project means contributing to a whole life carbon management process that supports the transition to net zero by 2050. All value chain members - asset owners, designers, constructors and suppliers - must understand their control and influence over carbon emissions and removals. Key principles include:

- Consider whole life carbon impacts across all project stages: need, optioneering, design, delivery, operation and end-of-life. Decisions should account for system level impacts, not just the asset
- PAS 2080 promotes a culture of collaboration across the value chain and encourages challenging conventional practices. Early engagement with stakeholders is essential to identify opportunities for innovation and low-carbon solutions
- Value chain members should understand what they can control directly and what they can influence through collaboration with others
- Value chain members are expected to challenge high carbon proposals and provide alternative solutions. Constructive challenge is a core part of PAS 2080
- Apply the Carbon Reduction Hierarchy:
  - Avoid – challenge the need for new assets, prioritise reuse or retrofit
  - Switch – adopt alternative low-carbon solutions, materials and technologies
  - Improve – optimise resource efficiency and integrate circular economy principles
  - Prioritise solutions that reduce carbon and deliver climate resilience, biodiversity net gain and social benefits

Carbon Data, Monitoring and Reporting

Businesses will be asked for whole life carbon data to calculate emissions and evaluate reduction options. Data must be robust, transparent and consistent as decisions will be risk and cost based.

- Define clear boundaries and data requirements early so assessments capture all relevant emissions
- Use consistent methodologies for whole life carbon assessments to ensure comparability across options and stages
- Improve data quality and accuracy progressively as the project moves from optioneering to design and delivery, reducing uncertainty and enabling better decisions
- Report progress against targets at agreed project intervals.
- Share lessons learned and good practice to support continual improvement across the value chain
- Effective record keeping is an important step. Projects will be required to detail the collaboration and challenge communications which led the decision-making processes

Tendering

PAS 2080 aligned tendering is not just about the price. Contractors will be required to demonstrate capability to deliver whole life carbon reductions and support the net zero transition. The tender submission should show how carbon management will be integrated into delivery and how the contractor will collaborate with the supply chain to achieve low-carbon outcomes. This can be demonstrated through practical examples and lessons learnt from past reductions.



Procurement

Procurement is a key driver for decarbonisation. PAS 2080 expects procurement processes to incentivise innovation, collaboration and whole life carbon reduction. Contracts should move away from prescriptive specifications and instead focus on outcomes that enable low-carbon solutions.

- Include and/or expect to see requirements for carbon performance in contracts, alongside cost and programme
- Contracts should allow for innovation and challenge prescriptive specifications
- Collaborative contractual arrangements are encouraged to maximise carbon reduction opportunities
- Risk allocation and incentive mechanisms should support adoption of novel low-carbon solutions



Leadership and Integrating Carbon into Decision Making

Leadership sets the tone for successful carbon management. PAS 2080 requires organisations to embed carbon into governance and decision-making processes, ensuring that whole life carbon reduction is treated as a core business priority alongside cost, time and risk. For many SMEs, integrating carbon into decision making will mean building on existing management processes rather than creating new ones.

- Set clear carbon management policies and embed them into business processes
- Assign roles and responsibilities for carbon management
- Promote collaboration and reward innovation
- Integrate carbon considerations into all decisions, from need stage to end of life
- Align projects with system level net zero targets and challenge conventional practices to enable low-carbon outcomes

Continual Improvement

PAS 2080 promotes a culture of learning and innovation. Continual improvement means capturing lessons learned, sharing data and good practice, and refining processes to accelerate decarbonisation across future projects and programmes.

- Capture and share carbon data and reduction solutions. Sharing knowledge across projects is encouraged to support improvement across the industry
- Review baselines, targets and processes regularly to improve accuracy and effectiveness
- Build capability and skills across the value chain to accelerate decarbonisation

WJ Group on their journey to PAS 2080

CASE STUDY

Who Was Involved & Process

For WJ Group, PAS 2080 accreditation was a collaborative, organisation-wide effort and involved the sustainability team, comprising a Director, two Advisors, and an Administrator, supported by wider business engagement. Building on a long-standing commitment to sustainability, internal awareness began in 2022, followed by mapping carbon reduction opportunities, embedding them in policy, and coordinating communication. WJ achieved certification in 2023, becoming one of the first organisations in the highways sector to do so, and has maintained it ever since.

What Went Well

WJ already had the capability to measure carbon reductions, develop Net Zero strategies, create lifecycle analyses and embed these into operational processes. A key tool is their expanding Greenhouse Gas (GHG) and Energy Management review spreadsheet, used quarterly to review past performance, current status, and forward plans. WJ also initiated a Greenhouse Gas Reduction Opportunity Register, where every potential reduction idea is logged, rated, and tracked to drive continual improvement. WJ also maintains detailed records of value chain collaboration with clients such as National Highways and partners such as Chevron and Kraton Chemical, demonstrating progress through shared initiatives and documented engagement and helping them recommend lower carbon alternatives, such as using retexturing instead of resurfacing to prolong pavement life.

Although initially setting up these systems and processes required significant effort, by the time certification was sought it was a case of aligning these with the PAS 2080 principles of Avoid, Switch, Improve and demonstrating how carbon management cut across the 9001, 14001 and 45001 standards.



1.5 - The PAS 2080 Journey

This section is aimed at helping SME organisations prepare for PAS 2080 implementation. Firstly, it is important to become familiar with the free **PAS 2080:2023 Standard** and **Guidance Document**. These two documents, alongside this guide and the **Carbon Reduction and PAS 2080 Demystified – An introduction for SMEs in civil engineering**, provide information on the actions needed to become a PAS 2080 certified organisation.

Gap Analysis

A gap analysis is one of the first tasks that should be carried out when starting out with PAS 2080. Completing this early will provide an understanding of the current level of alignment before making any changes to processes or documentation. This ensures that effort is focused on the areas that require the most attention and prevents unnecessary work.

The accompanying Gap Analysis Tool (See appendices, Page 41) supports this process by breaking down the standard into its individual clauses and outlining the types of evidence typically expected for each area.

Using this tool will assist with:

- Identifying existing evidence that already aligns with PAS 2080
- Highlighting areas where further development or improvement is needed
- Understanding the scale of work required before engaging certification bodies
- Planning resources, timelines and training requirements more accurately
- Structuring and simplifying evidence gathering by mapping requirements clause by clause

The tool is intended to provide clear guidance on what to review, what evidence to seek, and where gaps may exist. Completing the gap analysis at the start of the journey establishes a strong foundation for implementing the changes needed to achieve certification.

Resources

PAS 2080 requires organisations to assign roles and responsibilities to establish the carbon management processes and value chain communications required by the standard. Having these roles identified early will support effective implementation and help highlight any knowledge gaps that need to be addressed through training.

Examples of different approaches to resourcing the work required to get ready for certification are set out below:

- Specialist individuals e.g. Carbon Manager
- Small teams from existing environmental or other related team members
- Larger teams whose roles interact with the standard e.g. procurement, commercial, design, environment, operational, work winning etc.
- Sponsorship from senior leadership in the business
- Use of external consultancy support if needed with associated costs

The key aim is to ensure the business has clear ownership of PAS 2080 activities and sufficient capability to embed whole life carbon thinking across operations.

CASE STUDY

McCann on their journey to PAS 2080

Key Challenges During Accreditation

Initially, the PAS 2080 structure was challenging to interpret compared with traditional ISO standards. To overcome this, a one-day gap analysis with BSI was booked to walk through each clause and identify where the business already met the requirements, and areas for improvement - a step that proved invaluable in focusing implementation efforts. This case study shows examples of how McCann met some of those key clause requirements.

Leadership (Clause 5): McCann established a PAS 2080 Steering Group, led from the top, with strategic oversight from the Highways Director and comprising senior leaders and departmental heads, creating clear ownership for carbon reduction. A Net Zero Roadmap and Carbon Management Policy set out targets to 2030 and 2040. Engagement is driven through an employee reward platform and the PAS 2080 Steering Group, embedding carbon awareness across the business.

Integrating Carbon into Decision-Making (Clauses 4 & 6): Carbon considerations were formally integrated into operating procedures, which covered design, procurement, construction and end-of-life stages.

Whole-Life Carbon and Target Setting (Clauses 7 & 8): Carbon returns are submitted through the National Highways tool and McCann has set reduction targets in line with the SBTi, with baselines developed to include Scope 3 emissions as data maturity increases.

Monitoring, Reporting and Procurement (Clauses 9 & 10): Carbon data is linked to project spend and supplier performance using a Strategic Supplier Evaluation form, capturing EPDs and carbon plans. Supplier engagement is enhanced through the Carbon Hub and Supply Chain Sustainability School.

Continual Improvement (Clause 11): McCann demonstrated commitment through Lean training for senior leadership, a portal for carbon reduction suggestions through their employee rewards platform, and development of an Emissions Dashboard for sites.

Outcome

In March 2025, McCann achieved full certification to PAS 2080:2023 with the audit commending strong integration of carbon management into decision-making and value-chain engagement, with no non-conformities raised and one opportunity for improvement noted around documenting project carbon risks.



Certification Bodies and Costs

A range of certification bodies award PAS certification. These include Lloyd's Register Quality Assurance (LRQA), British Standards Institution (BSI) and National Quality Assurance (NQA), amongst others.

For a PAS 2080 designer or constructor, audits typically include the following elements:

- Stage 1 Audit (1 day) – an initial review of documented processes and readiness. This is only required during the first certification year
- Stage 2 Audit (approximately 3 days) – a more detailed assessment of how your processes work in practice and whether you can demonstrate compliance with the standard

As of 2026, typical costs for a year one certification range between £2,500 and £10,000, depending on business size and complexity. Size considerations will also impact the days outlined above.

Follow-up annual assessments require fewer audit days, with costs reducing to between £2,500 and £5,000.

Stage 1 and Stage 2 audits are staggered to allow time for closing out findings. The period between audits can be agreed with your certification body and generally ranges between 1 and 6 months, depending on how much work is required to align with the standard and the resources that are available.

If internal resources are limited, third party consultants are able to support with the gap analysis and implementation work, which will range between £5,000 and £15,000.

Policy Documents

Organisations must have policies that clearly set out their approach to managing whole life carbon and demonstrate leadership commitment. These policies should:

- Align with organisational goals and net-zero commitments
- Describe the organisation’s approach to carbon reduction, collaboration, and continual improvement
- Be communicated internally so all staff understand expectations
- Be reviewed periodically to ensure relevance and ongoing compliance

Carnell on their journey to PAS 2080

CASE STUDY

When starting the accreditation process Carnell Support Services Ltd found they were on the right path through ongoing activities around carbon reduction. One of the first actions was to clearly document their approach as the “Carbon Management System”, setting out clear processes representing everyday work (carbon reporting, etc) where none had been previously documented. The Carbon Management System documents the company’s current activities, future plans, and compliance with external requirements such as client expectations and government regulations. It also demonstrates the company’s capability to meet all PAS 2080 standard requirements with clear evidence.

One key challenge was evidencing knowledge sharing, with the standard requiring constructors to train employees on carbon reduction and engage with value chain partners. Carnell already provided relevant in-house training covering carbon reduction and participated in industry forums and communications but lacked a clear plan. To address this, Carnell created a training log and plan to fill gaps, including timelines.

Recording participants, topics, and frequency of training demonstrated the company’s capability in knowledge sharing.

During the accreditation process a small team including their Plant and Transport Director, SHEQ Director, Procurement Manager, Carbon Co-ordinator and Supply Chain Co-ordinator were responsible for putting in place the right systems and processes to ensure success.



Processes

PAS 2080 requires businesses to embed whole life carbon considerations and PAS 2080 principles, such as the carbon reduction hierarchy, into the business management systems.

Typical processes that may require updating include:

- Procurement processes
- Design and optioneering workflows
- Change control and technical approvals
- Commercial and risk management processes
- Site planning and operational procedures

The extent of this review will be dependent on the outcome of the gap analysis review.

Communication and Training

PAS 2080 requires organisations to create a culture of understanding and awareness that reaches all employees. Effective communication and training help embed carbon management into everyday practice.

Activities may include:

- Internal briefings outlining PAS 2080 responsibilities
- Webinars or online sessions for staff
- Toolbox talks for site operatives
- Role-specific training for procurement, design, commercial, environment, and operational teams
- Awareness campaigns within internal news documents and team meetings.

Businesses should also identify suitable external training resources. Providers such as the Supply Chain Sustainability School offer free training courses relating to carbon, whole life assessment and PAS 2080.

The aim is to ensure that everyone understands how they contribute to PAS 2080 and the wider transition to net-zero.

1.6 - Harder to Understand Clauses

Some of the PAS 2080 clauses can be harder to understand for SME organisations, who may have limited influence over design. Below are some examples of how an SME can demonstrate compliance with PAS 2080 whole life carbon and nature-based solutions clauses.

Whole life carbon

Whole life carbon is the total greenhouse gas emissions associated with an asset across its entire lifespan – not just construction. PAS 2080 requires organisations to manage carbon from concept to end-of-life. Whole life carbon typically includes capital carbon (raw material extraction and manufacture, transport to site, and construction activities); operational carbon (energy and fuel used during operation; routine maintenance and replacement) and end-of-life carbon (demolition and decommissioning; material disposal, recycling or reuse).

SMEs can have a significant role to play in reducing capital emissions during the construction of a project through reducing construction emissions onsite and managing materials carefully to avoid material wastage and improve efficiency. They can also help reduce post-construction operational and end-of-life emissions through suggesting designs that reduce reactive maintenance, and specifying components/materials with a longer lifespan. Suggesting solutions that avoid pumps, generators or frequent plant use can also help to reduce operational carbon emissions. SMEs can also consider end-of-life emissions by enabling easy removal or replacement of components

when constructing a new asset, avoiding contamination of soils or aggregates so they can be reused or recycled at end of life, and choosing materials with established recycling routes and that can be reused or recycled.

Nature-based solutions

Nature-based solutions refer to using natural systems and processes to achieve infrastructure outcomes while reducing whole life carbon and delivering wider environmental benefits. Nature-based solutions are measures that use vegetation, soils, water, and ecosystems instead of (or alongside) engineered solutions. They often deliver multiple co-benefits, such as biodiversity gain, air quality improvements, flood resilience and climate adaptation. Nature-based solutions can also contribute to whole-life carbon reduction by managing water naturally (thereby requiring less pumping, treatment and maintenance); shading highways and buildings (which helps to reduce surface deterioration and helps to cool urban environments) and reducing long-term maintenance needs. Table 1 below identifies some nature-based solutions opportunities by SME Type:

__Table 1:__ Nature-based solutions opportunities for SMEs.

SME Type	Nature-based solutions opportunities
Groundworks/ civils SME	Topsoil reuse, reduced excavation, vegetated earthworks. Retaining existing trees/vegetation onsite.
Landscaping/ environmental SME	Planting, habitat creation, verge management.
Drainage SME	Swales instead of concrete drainage channels, attenuation basins, permeable surfaces. Stabilising slopes with planting instead of retaining walls.
Highways maintenance SME	Grasscrete, green verges, tree pits and planting, erosion control
Consultancy SME	Nature-based solutions identification, options appraisals.

SMEs are not expected to produce complex carbon assessments, but they can prove they adhere to the nature-based solutions clause by sharing ideas early as part of early contractor involvement (ECI) and when formulating a bill of quantities and explaining why a natural solution is preferable. The level of assessment should be proportionate to the SME's role. Early proposals and documented consideration of nature-based operations can contribute to the evidence of conformity.

CASE STUDY

Delivering Zero Diesel Construction

The UK has made the commitment to transition to net zero carbon by 2050. For the construction industry this will include reducing - and ultimately eliminating - the sector's use of diesel, the dominant fuel in construction across the UK. At the same time, the industry must accelerate the use of alternative fuels, equipment and solutions.

To support this work, the Construction Leadership Council's Zero Diesel Sites Working Group has launched **Zero Diesel Construction**, a website showcasing resources and case studies of suppliers and construction sites actively reducing their diesel emissions by:

a) improving efficiency

b) transitioning to cleaner fuels

c) transitioning to electric

d) or, more often, a combination of all three.

Zero Diesel Construction is an evolving website, developed with the support of multiple industry players, and hosts a range of **case studies**, and **tools and resources**, including:

- **NRMM Decarbonisation Strategy** - Imperial College London and HS2
- **Optimised Idling Toolkit** - Reminding site teams of the importance of optimised idling, Supply Chain Sustainability School
- **HS2 Optimised Idling Video** - Understanding the implications to health, fuel waste and carbon emissions
- **Comprehensive Guide** - Responsible Sourcing of HVO (Supply Chain Sustainability School)
- CONIAC Guidance on the H&S implications of diesel alternatives

(Draft documents at time of writing)

  - **Solar PV**
  - **Onsite Li-ion Batteries (BESS)**
  - **HVO**

ConstructZERO
The Construction Industry's Zero carbon change programme



Obtaining PAS 2080

Section 2 – Estimating, Monitoring, and Reporting Emissions (Tools)

2.1 - Step #1: Boundary and scope setting

To calculate carbon emissions the first decision is to establish whether this is for an organisation as a whole or a specific element such as work associated with a project or work package. This is known as setting the 'boundary' constraints. If the organisation wishes to calculate emissions to feed into target setting and strategies such as a PPN 006 Carbon Reduction Plan (**PPN 006: Technical standard for Completion of Carbon Reduction Plans - GOV.UK**) they would need to report their organisational Scope 1 and Scope 2 emissions and the five Scope 3 categories specified in the PPN 006 technical standard. If the emissions are to be provided to a particular client or principal contractor (if acting as a subcontractor) for a project, then the boundary would be set around that specific element.

Organisations also need to determine which elements should be included in the emission calculation. This is typically achieved by considering whether it has financial or operational control of activities relating to that element. Where there is such direct control, then it is likely that the emission is your responsibility and is considered in 'scope' and should be included in the calculation. Further detail on setting boundaries can be found in the **Greenhouse Gas Protocol Corporate Standard** as well as within the **Energy and Carbon Training section** of the Supply Chain Sustainability School.

2.2 - Step #2: Time period

The next step is to decide the period across which measurement should be set. This can be the calendar year, the tax year for company reporting, quarterly or monthly for project reporting or a custom period for the whole project assessment.

If the measurement is to be repeated or compared against another set of data, a consistent approach should be followed. All assumptions and caveats should be documented to give context, and for transparency.

A carbon baseline year should be selected, which subsequent annual performance can be compared against. The baseline year should be representative of the business and its operations.

2.3 - Step #3: Data gathering

Data for each carbon Scope should be collected and categorised, with emission factors assigned as per Step 4.

Energy consumption (which falls into Scopes 1 and 2 as shown in Table 2) can be measured as the quantity of fuel (litres) or utilities usage (e.g. electricity in kWh or gas in m^3). Other indirect energy use would fall into Scope 3 and can be measured through metrics such as total mileage or fuel spend for business travel or commuting, the quantity of waste, etc. if an associated emissions factor is available and is used.

Purchased goods and services (PGS) are made up of the materials that are purchased and consumed by the organisation whilst delivering works activities and day to day operations, as well as services paid for to support operations. For contractors this can be the majority of emissions, particularly where they are responsible for the purchasing of their own materials. These emissions sit in Scope 3 and are considered to be indirectly controlled by organisations.

Examples of typical data that should be gathered and their sources are given in Table 2.



Table 2: Examples of data gathering for carbon reporting.

Scope	Energy consumed / emissions source	Typical units
1	Company vehicle fuels (petrol, diesel, biofuels etc.). See link and latest factors under Research and Statistics section - **Greenhouse gas emissions - GOV.UK**	Litres Split by fuel type e.g. diesel, petrol, etc.
	Company vehicles (where no fuel data available)	Miles (or kilometres) Odometer readings / mileage travelled Note: take care to split out business and personal travel
	On-site electrical generation (diesel/gas oil use)	Litres Estimation technique: manufacturer's fuel consumption x hours run (generator)
	Gas (mains supply)	m^3 Meter reading or utility bills
	Air conditioning units (for GHG release)	kgs of refrigerant Service records
2	Electricity (mains supply)	kWh Meter reading or utility bills
3	Water consumption (potable supply)	m^3
	Waste produced and its disposal route e.g. recycled or sent to landfill	Tonnes Waste transfer notes
	Materials purchased and consumed such as concrete, steel and aggregates	Tonnes, kg or m^3
	Services purchased such as consultancy, training and legal advice	Cost of service in £
	Private vehicles (used for company business) (Grey fleet)	Miles (or kilometres) Expenses claims/cost per mile



When collecting data, always look to collect the most accurate data possible e.g. litres of fuel used based on receipts or delivery tickets, quantities of electricity (kWh) or gas (m^3) used based on smart meter readings etc., ahead of proxy measures that may introduce small margins of error e.g. miles driven where actual fuel consumption would be influenced by driver behaviour, type of vehicle, engine size, etc. Where proxy measures are to be used refer to data sources such as the DEFRA metrics for the relevant year **Government conversion factors for company reporting of greenhouse gas emissions - GOV.UK**.

Also be aware of the potential for double-counting, for instance, if collecting total vehicle fuel consumption in litres of fuel, it is not necessary to get mileage data too, as it would reflect the same energy source. Similarly, with the rise of battery electric vehicles, ensure electricity consumption for charging isn't double counted.

Where an organisation works for multiple clients and is unable to accurately separate the energy used to deliver work for each, for example if vehicles work for different clients during shifts or in between fuelling, it may be necessary to apportion carbon across them. This can be done by calculating emissions at an organisation level, for example total fuel usage, and then splitting this out as a percentage of the revenue generated from each individual client. Some online carbon calculator tools, such as that available via the Supply Chain Sustainability School, will do this for the organisation.

2.4 - Step #4: Emissions factors

An emissions factor is a multiplier which can be used to convert activity data into an estimate of carbon emissions. The UK Government publish a set of emissions factors for many different fuel, energy and vehicle types which are updated annually. Presented in a table format, you first identify the fuel type or emission source type relating to the base unit of measure of your data. Look up the table for the CO_2e figure for the relevant fuel and unit. (See link here **Government conversion factors for company reporting of greenhouse gas emissions - GOV.UK** also at the end of the document).

Environmental Product Declarations (EPDs) give bespoke environmental information including carbon impacts for a specific material or product from a particular supplier. They are considered the gold standard in carbon data and offer the most granular information that can be provided for a product or material.

EPDs provide the sort of evidence needed to allow proper comparison of one material or product against another. EPDs are voluntary and do cost suppliers money to develop and publish – they may not be available for the materials or products used in your normal operations.

Purchased Goods and Services (PGS) emission factors can be found either via EPDs as outlined above, or by data provided by the product manufacturer which has been generated in line with a recognised methodology. For example, asphalt products in the UK should have an emission factor that has been calculated in line with the asPECT (asphalt Pavement Embodied Carbon Tool) Protocol, which is managed by the Transport Research Laboratory (TRL) and aligns with other internationally-available standards, such as ISO 14067 and PAS 2050.

Where individual product emission factors are not available, a generic factor can be used, with common databases of materials being the ICE database, the National Highways carbon tool and the DEFRA factors.

For materials emission factors, most are cradle to gate which covers the A1-A3 steps in carbon accounting i.e. they do not include emissions associated with transport of the materials to your site (A4). Some suppliers are able to calculate and provide this A4 data for you, if not an estimate can be made based on the distance from the point of sale or production to your site using an appropriately sized vehicle and a generic emission factor from DEFRA.

2.5 - Step #5: Calculation of carbon emissions

The calculation of carbon emissions is based on a simple method:

Carbon emission =
energy or material consumption
× relevant emissions factor

For example:

Energy consumption
= 143,219 litres diesel

Emissions factor (from UK Gov emissions factors 2025 dataset) – see extract on the following page:

Table 3: Diesel emission factors published by the UK Government.

Fuel	Unit	kgCO_2e	kgCO_2	CH_4 contribution (kg CO_2e)	N_2O contribution (kg CO_2e)
Diesel (average biofuel blend)	tonnes	3087.94462	3048.71	0.34720	38.8874
	litres	2.57082	2.53763	0.00029	0.03290
	kWh (Net CV)	0.25953	0.25620	0.00003	0.00330
	kWh (Gross CV)	0.24411	0.24098	0.00003	0.00310

Emission

= 143,219 ltrs × 2.57082 kgCO_2e/ltr

= 368,190 kgCO_2e

or 368.2 tonnes CO_2e

Calculate the emissions for each fuel type and/or source to produce a total figure.

If asked to provide emissions data for a package of works completed, such as laying a length of kerbing, this can be calculated by adding together embodied carbon data for all materials used onsite, with the carbon data for fuel used to transport people and materials to site and the use of plant and machinery. The example below (Table 4) is for a single activity; where multiple activities are taking place in a package of works these can be calculated and aggregated together to provide an overall total.

For example - Laying 100m of new kerbing:

Table 4: Carbon output of laying 100m of kerbing.

Fuel / Material	Unit	kg CO_2e per unit	Total amount	Total carbon kg CO_2e
Diesel (used in vehicles)	**litres**	2.57082	25	64.3
Petrol (used in equipment)	**litres**	2.06916	12	24.8
Concrete ST1 CEM II blend (A1-A4 i.e. includes delivery)	m^3	144	11	1,584
Kerbs 125x255mm Straight (62kg per kerb) (A1-A3)	Tonnes	170	115 kerbs = 7.13t	1,212.1
Kerbs – delivery (A4 – UK Gov emission factor for delivery vehicle 50% laden)	Miles	1.25789	20	25.2
Total Carbon				2,910.4

2.6 - Step #6: Reporting

The sum of all emissions calculated, typically as $kgCO_2e$ or tCO_2e, should be reported.

To allow effective comparison of data, it may be appropriate to normalise the output to give a measure of carbon intensity e.g. tCO_2e/£ turnover, tCO_2e/m^2 floor area, tCO_2e/hrs worked, etc. This allows a business to show how carbon performance changes over time, for example if carbon intensity declines, this reflects better efficiency or productivity in carbon terms for a given unit of measurement. In the example above the data could be used to set a benchmark for a shift or for 100m of kerbing, allowing improvements to be made from that figure.

A brief description of the period selected as well as the scope and boundary should be detailed so that the reader will understand what has been measured and when. Any caveats or assumptions should be clearly set out, as well as any changes in approach to data gathering or calculation, to show how data quality is improving over time periods.

2.7 - Estimation techniques

Whilst every effort should be made to gather accurate information i.e. actual quantity of energy or materials consumed, sometimes this is not possible, and estimation techniques should be used. Methodologies should be clearly documented so that there is transparency around how the data was calculated and to show where improvements in data quality could be made in future reporting periods.

Typical examples include where direct fuel consumption of vehicles or plant is not available. Alternatives could include distance travelled i.e. mileage for which there is a direct emissions factor. Where this is not possible, an estimation of hours, for example, of operation linked to the manufacturer's stated typical fuel consumption per hour, could be used to estimate consumption.

A further scenario might be where shared office space is used; estimation options could include accounting for the proportion of floor space or proportion based on headcount/occupancy levels of the total energy consumption. Where such shared facilities are used, it is worth checking the boundary and scope of reporting of any other parties to ensure that double counting and reporting is not occurring.

For purchased goods and services such as materials, estimating emissions can be done a number of ways in line with the existing **Scope 3 Calculation Guidance | GHG Protocol**.



2.8 - Tools for calculating carbon footprints

There are several tools freely available that have, in some circumstances, been produced by clients that help the calculation of the carbon footprint. Such tools are typically project specific. The same basic approach applies in establishing the boundary and scope and gathering base data for a noted period. The data is then simply entered into the tool (often based on Excel worksheets), and it will calculate the carbon footprint in the desired format. Links to some of these calculation tools can be found in Section 4.

2.9 - Target setting

While it is important to measure and report project or company emissions in line with client or legal requirements, the aim should be to reduce absolute emissions as far as possible.

This makes good business sense, as reducing emissions can lower energy costs and reduce environmental impacts.

Good practice is to set measurable emissions reduction targets and implement actions to achieve them. Under PPN 006, suppliers bidding for relevant central government contracts valued above £5 million per year, including VAT and averaged over the contract's lifetime, must provide a Carbon Reduction Plan where the requirement is relevant and proportionate.[1]

The plan must confirm a commitment to achieving net zero by 2050 for UK operations, report the required emissions data and describe measures to reduce emissions.

The SME Carbon Reduction Plan Template (see appendices) also provides a useful starting point for businesses developing their own targets and reduction actions.

Any such target should be relevant to the business or project. Targets are often based on a reduction in emissions by a pre-determined percentage, or a reduction in the quantity of a specific fuel. Supporting such targets will be a series of specific time-bound actions that will deliver the reductions. Factors to consider in setting such targets would be the cost-benefit, resources available, and practicality in the business context.

More widely, the UK has a legally binding target to achieve net zero greenhouse gas emissions by 2050, supported by five-year carbon budgets. Its 2035 Nationally Determined Contribution (NDC) under the Paris Agreement commits the UK to reducing greenhouse gas emissions by at least 81% compared with 1990 levels, excluding international aviation and shipping. These national commitments inform government policies, regulations and procurement requirements affecting businesses. Separately, the Seventh Carbon Budget limits total UK emissions over 2038-2042, including the UK's share of international aviation and shipping emissions.

1: UK Government (2025): PPN 006: Technical standard for Completion of Carbon Reduction Plans. Available at: **https://www.gov.uk/government/publications/ppn-006-taking-account-of-carbon-reduction-plans-in-the-procurement-of-major-government-contracts/ppn-006-technical-standard-for-completion-of-carbon-reduction-plans-html**

Section 3 – Key actions to reduce emissions

3.1 – Introduction

After measuring and baselining emissions, you should focus on where you can achieve the greatest CO_2e savings and produce a plan (see Appendices for example) which outlines targets, actions to meet them, and clear responsibilities. This plan can be at a business level or a project level, although there will be similarities and overlaps for both e.g. decisions around switching vehicle fuel. A good starting point would be to align decision making around the Avoid, Switch and Improve approach from PAS 2080:

1) Avoid

Avoiding or reducing emissions at source is often the simplest way to reduce carbon emissions without changing ways of working, materials etc. Aligning decision making processes with the carbon reduction pathways laid out in a carbon reduction plan ensures that choices are made with the overall aim of reducing carbon emissions, at all stages of a business or project lifecycle.

- Reduce energy consumption within offices or buildings
- Reduce vehicle numbers and the total number of miles driven and therefore fuel consumed
- Eliminate wasted materials during construction and order only the materials needed for a project
- Transition to a new business model, undertake alternative operations or provide new products/services that are inherently lower carbon



Thermal Road Repairs – case study on whole life and emissions avoidance

CASE STUDY

Thermal Road Repairs (TRR) worked collaboratively with Tarmac and National Highways to pilot an innovation-led "Find and Fix" maintenance approach on the A46 Risk Reduction Scheme. Using TRR's PAS 2080 aligned carbon management principles, the team focused on repairing small pavement defects within existing traffic management layouts, removing the need for additional closures and minimising disruption. TRR's AI-driven automated survey system scanned the network at live traffic speeds – up to 60 mph – identifying defects early and accurately. This allowed TRR to carry out targeted, high-quality thermal repairs alongside planned resurfacing works, without interfering with core operations. By incorporating in situ recycling through thermal technology, the intervention avoided waste generation, reduced the need for virgin materials, and streamlined the entire repair process.

Recycling failed asphalt in place removed the need for planing, disposal, hauling, and replacement materials, resulting in far fewer deliveries and reduced plant movements, as well as avoiding additional traffic management, reducing idling and congestion, and eliminating repeat maintenance visits. The project delivered major environmental and operational benefits, most notably an 86% reduction in carbon emissions. The repairs restored the structural integrity of the pavement, preventing water ingress, and increasing whole life performance by reducing the likelihood of premature failures. Overall, the scheme demonstrates how innovation-led, and proactive maintenance, can avoid future emissions and deliver whole life benefits and asset resilience.



2) Switch

Assess alternative low-carbon solutions and then adopt one that reduces operational and whole life emissions through alternative scope, design approach, materials, technologies for operational carbon reduction, etc.

- Install renewable energy generation to produce electricity and gas onsite
- Adopt low-carbon technologies (on-site, transport and fuels, etc.)
- Purchase inputs and services with lower embodied/embedded emissions

3) Improve

Make use of technologies and better planning to drive efficiencies from existing solutions, at a business level and for individual projects. Identify and adopt solutions and techniques that improve the use of resources and design life of an asset/network, including applying circular economy principles to assess materials/products in terms of their potential for reuse or recycling after their end of life.

- Reduce the intensity energy purchased e.g. REGO (Renewable Energy Guarantees of Origin) backed electricity
- Real and relative (per unit) reductions in carbon and energy
- Efficiency in operations, processes, fleet, and energy management
- Optimise approaches e.g. technology and digital as enablers
- Install infrastructure that can be broken down and reassembled on another project in the future

Residual and 'unavoidable' emissions can be compensated for through carbon removals, offsets and other commercially available mechanisms such as carbon credits. They can also be mitigated through actions that support climate action such as changes to land management and nature-based solutions. These actions are likely to require engagement with asset owners, usually a client organisation, or other stakeholders involved in a project and should be considered as early on in a project lifecycle as possible.

You are also likely to need to improve the carbon literacy and understanding of your workforce through comprehensive training and awareness. This is important to ensure that everyone in your organisation understands the impact they can have on reducing carbon emissions in their role.

Mott MacDonald Bentley (MMB) – Avoid, Switch and Improve in action

CASE STUDY

MMB successfully applied PAS 2080 principles to a project at Killinghall Sewage Treatment Works, in collaboration with Yorkshire Water and their supply chain, to shift the project from traditional construction to innovative low-carbon solutions.

Through smart design, the team reduced the number of concrete settlement tanks built on site and used precast units for a number of installations utilising a Design for Manufacture and Assembly (DFMA) approach. This avoided emissions through reduced material use and reduced construction time on site. The design also replaced plastic media filters with an aerated reed bed. This switch eliminated the need for additional secondary treatment, reducing operational expenses and carbon emissions. Other carbon saving changes included replacing a concrete grit removal structure with a partially buried mild steel tank, combining delivery and export bays into a single unit and reducing operational energy needs by taking a whole life approach when considering carbon impacts.

The project also used innovative 3D printing of concrete distribution chambers which were manufactured offsite. These were the first of their kind in the UK for water retaining structures and this solution significantly reduced material usage by 44%, shortened installation time, and reduced embodied emissions by 38%.



MOTT MACDONALD

CASE STUDY

M Group – collaborating with SME supply chain to deliver carbon reductions

M Group Highways collaborated with regional SME contractor RK Bell on the A3102 Safer Roads Scheme within the Wiltshire Highways contract, and demonstrated strong alignment with PAS 2080 principles through a proactive approach to carbon reduction. From the outset, RK Bell used the tender process to propose a suite of low-carbon material alternatives, integrating carbon considerations directly into their package of works delivery proposal and bill of quantities. The organisation also went further by quantifying the potential carbon savings of each of these alternative materials which was supported by a full scheme carbon assessment undertaken by M Group, confirming a 33% reduction in scheme carbon emissions.

Through active participation in carbon workshops, supply chain forums, and collaborative design discussions with M Group, many of the suggested alternatives were carried forward into the final scheme design. Notably, several of these adopted low-carbon alternatives are cost neutral or only marginally more expensive than traditional materials, demonstrating that lower-carbon choices need not always come with prohibitive cost increases. Examples included low-carbon concretes, recycled Type 1 and 6F4, and use of HVO fuel for plant and vehicles.

Across the project, RK Bell demonstrated strong PAS 2080 credentials, consistently contributing carbon-saving ideas and engaging collaboratively with both the main contractor and asset owner, Wiltshire Council. Their approach provides a clear example of how SMEs can successfully embed PAS 2080 principles, influence scheme carbon outcomes, and drive low-carbon innovation within the supply chain.



M GROUP

3.2 – Sector suggestions for reducing carbon emissions

Table 5: Actions to reduce carbon emissions.

Topic	Area	Actions
Energy	Corporate	• Undertake energy audits of permanent premises and monitor energy consumption. Set targets for reduction • Procure utilities on 100% renewable energy sources, potentially as REGO (Renewable Energy Guarantees of Origin) tariffs • Establish an energy reduction plan, including a behaviour change plan
	Engineering/ construction site	• Prioritise and plan early connections to the grid • Make renewable & low-carbon power sources (electric, hydrogen, hybrid, etc.) the accepted standard for all plant and machinery (generators, tower lights, pumps, etc.) • Ensure accommodation incorporates energy-efficient, renewable & low-carbon technologies
Transport/ plant & machinery	Corporate	• Cost and plan the transition to EV and ULEV vehicles. Incentivise staff to select these vehicles. • Establish a programme to install charging points for electric vehicles, both at work and in homes • Encourage and incentivise conservative fuel consumption driving behaviours (via vehicle trackers, etc.) • Put in place a Green Travel Plan to reduce the overall miles travelled e.g. encourage the use of virtual meetings and public transport where appropriate
	Engineering/ construction site	• Use energy-efficient plant & machinery (electric, hydrogen, hybrid, HVO fuel, etc.). Consider lifecycle cost, fuel savings and potential for greatest carbon saving • Monitor telematics for plant & machinery and produce idling reduction plans/training • Plan logistics to minimise delivery miles/ consolidate deliveries

Topic	Area	Actions
Transport/ plant & machinery	Engineering/ construction site	• Minimise the movement of excavated material off-site and distances moved on site
Waste	Engineering/ construction site	• Drive a circular economy by ensuring management plans for materials and waste are in place & regularly reviewed and updated • Reduce waste through careful specification and buying with takeback agreements • Select your waste contractor based on their waste recovery rate. Find out what happens to your waste! • Identify avoidable wastes and investigate methods of reducing their use • Prioritise waste reuse options e.g. charities, ahead of disposal
Materials	Engineering/ construction site	• Prioritise the use of recycled, secondary, and low carbon materials • Purchase materials that meet a sustainability standard (e.g. **BES 6001**) • Buy local materials wherever possible to reduce transport impacts • Reduce whole life carbon by considering the longevity of the materials that you use – if they need to be replaced frequently, their impact will be greater • Ask your suppliers for Environmental Product Declarations (EPDs) and use this data to compare and select products. Undertake a life cycle assessment on key materials being used and identify alternatives
Design	Engineering/ construction site	• Consider carbon through design and specification decisions • Propose low-carbon solutions to clients within tenders/delivery

Topic	Area	Actions
Design	Engineering/ construction site	• Challenge clients if you have an innovative low-carbon solution to offer • Ensure temporary works are as efficient as possible and explore low-carbon options • Incorporate design for disassembly and other circular economy principles into your design • Ensure structural material strengths are not generalised but optimised for different uses • Try to standardise components and designs • Maximise offsite production and modularisation and measure carbon savings
Leadership and awareness	All leaders and company staff	• Upskill your leaders and ensure staff know this is a business priority • Set targets based on the company's footprint and break down the emissions by target date, business area or project (some will be much easier than others) • Roll out a carbon literacy programme with training appropriate to the job role. Use existing free resources such as those provided by The Supply Chain Sustainability School • Incentivise staff to act and address carbon within their remit

CASE STUDY

Murphy – low-carbon materials and value engineering

The Greek Street Bridge replacement project, delivered by Murphy for Network Rail in Stockport, has been designed to meet engineering and operational requirements, minimise environmental impact and enhance community value. Murphy has taken a proactive approach by integrating carbon-conscious decisions throughout the project lifecycle. This included focussing on early engagement with designers, reducing the impact of carbon intensive materials and implementing a fuel and waste hierarchy. A list of measures implemented can be found in Table 6 on the following page.

Figure 3: *Greek Street Bridge Replacement Project. Image provided by Murphy.*



Table 6: Carbon Reduction Measures Implemented.

Area	Action / Decision	How it reduces carbon	Quantified outcome
Design & materials	Early design optimisation and material efficiency	Reduced embodied carbon through optimised materials quantities and selections	**3% reduction = ~57 tCO_2e saved**
Precast concrete	Use of **CEM III/A** with **40% GGBS**	Lower cement clinker intensity vs CEM I	**34% lower CO_2 per tonne of concrete** (vs CEM I baseline)
Reinforcement	**100% recycled steel** reinforcement in precast units	Avoids primary steelmaking emissions	**Up to 1.5 tCO_2 saved per tonne of steel**
Site power	Direct **grid connection** using **certified renewable electricity**	Displaces diesel generation and grid average	**~26 tCO_2e saved**
Plant fuel	**ISCC certified HVO** for all plant incl. two 1,000 t cranes	~80% lower lifecycle GHG vs fossil diesel	**~35 tCO_2e saved**
Waste logistics	Direct **sewer connection** for welfare effluent	Removes tanker haulage	**~1 kg CO_2e saved per tonne of septic waste**
Temporary lighting	**Solar powered & hydrogen fuelled** tower lights	Zero tailpipe CO_2; no NOx/SO_2/ PM vs diesel	**Not quantified**
Materials & waste	**99.7% landfill diversion**; crushing concrete/brick for aggregates; treatment of contaminated soils	Avoids landfill and displaces virgin aggregate production	**6,949.8 tonnes diverted**
	Estimated total savings: >270 tCO_2e (15.4% overall saving)		



Section 4 – Training & Useful Links

The following section provides links to further reading and useful links to organisations and bodies that provide more detailed information around Carbon and often offer associated training on the topic.



Appendices / Supporting Tools

Calculating your Carbon Footprint and Carbon Reduction Plan

- SME Carbon Data Calculator
- SME Carbon Reduction Plan Template
- SME Carbon Data Collection Template

PAS 2080

- PAS 2080 - Improvement plan template
- PAS 2080 - Gap Analysis Tool
- PAS 2080: 2023 RACI Matrix
- PAS 2080 - Internal Audit Template
- PAS 2080 - Organisational Maturity Survey Template

Table 7:

Standards & Supporting Third Party Verifications/Accreditations

Organisation	Type	Topic	Link
Achilles	Emissions verification programme (ISO 14064 or PAS 2050 accreditation)	Certification to ISO 14064 or PAS 2050. Offers calculation methodology. Fees apply.	**Carbon Reduce Programme**
British Standards Institution (BSI) SME Net Zero Standards Hub	PAS 2080:2023 Standard	PAS 2080:2023 standard is available for free download on the BSI SME Net Zero Standards Hub	**BSI SME Net Zero Standards Hub**
British Standards Institution (BSI) SME Net Zero Standards Hub	ISO 14064 – Quantifying and Reporting Greenhouse Gas Requirements	The ISO 14064 standard details how to quantify and report on GHG emissions. The standard is available for free download on the BSI SME Net Zero Standards Hub.	**BSI – ISO 14064**
British Standards Institution (BSI) SME Net Zero Standards Hub	BSI Flex 3030:2024	BSI Flex 3030:2024 is a new BSI standard titled 'Net Zero Transition Plans – Code of Practice' specifically designed to support SMEs in developing credible and actionable Net Zero plans. BSI Flex 3030: 2024 is available for free download on the BSI SME Net Zero Standards Hub.	**BSI SME Net Zero Standards Hub**
The Carbon Trust	The Carbon Trust – PAS 2080	Can help organisations comply with PAS 2080 through gap analyses/action plans and provides third-party emissions verification. Fees apply.	**Carbon Trust website**
Climate Group	ConcreteZero	Global corporate initiative led by Climate Group. Organisations that join make a commitment to buy and use 100% Net Zero concrete by 2050, with interim 2025 and 2030 targets.	**ConcreteZero website**
Climate Group	SteelZero	Global corporate initiative led by Climate Group. Organisations that join make a commitment to buy and use 100% Net Zero steel by 2050.	**SteelZero Website**
BSI/ISO	ISO 14068-1: Carbon neutrality	This is a standard that enables participating organisations to prove that their claims to be 'carbon neutral' can be shown to be genuine.	**ISO 14068-1 Executive Briefing**
Science-Based Target initiative (SBTi)	Science-Based Targets (SBTs)	Process and declaration tool for setting science-based carbon reduction targets for 2050 (when emissions are already known).	**www.sciencebasedtargets.org**

Table 8:

Sector carbon guidance

Organisation	Name	Topic	Link
Construction Leadership Council (CLC), Institution of Civil Engineers (ICE), The Green Construction Board (GCB)	Guidance Document for PAS 2080	Accompanies the PAS 2080:2023 standard and provides guidance on meeting the clauses in the standard.	**Guidance Document for PAS 2080**
Construction Leadership Council (CLC) & the Green Construction Board (GCB)	The Routemap for Zero Avoidable Waste in Construction	Routemap aims to eliminate avoidable waste in construction by 2050. It provides some action themes and guidance for eliminating waste in design and procurement throughout a project lifecycle.	**Zero Avoidable Waste Routemap**
Construction Leadership Council (CLC) and C0$_2$nstructZero	Zero Diesel Construction	An industry-wide UK initiative helping construction businesses phase out diesel use to cut carbon emissions, in line with the Construction Leadership Council's (CLC) Zero Diesel Routemap under the C0$_2$nstruct Zero programme.	**Zero Diesel Construction Routemap**
Department for Transport (DfT)	Quantifying Carbon Emissions for Local Transport Planning	Provides guidance for calculating whole-life carbon emissions within the local transport sector, at all project lifecycle stages.	**Quantifying carbon emissions for local transport planning - GOV.UK**
Federation of Small Businesses (FSB)	Sustainability Hub	The FSB Sustainability Hub for SMEs is available on their website, with lots of helpful information and resources. Other guidance includes How to calculate your carbon footprint as an SME business and A Guide to Carbon Offsetting for small businesses.	**Guidance – How to get started with sustainability**
Highways Sector Council	PAS 2080 Alignment Toolkit Whole-life Carbon	An online resource created by the Highways Sector Council to help organisations understand, apply, and align with the PAS 2080 carbon management standard	**PAS 2080 Toolkit**
Royal Institution of Chartered Surveyors (RICS)	Whole Life Carbon Assessment (WLCA) for the Built Environment	This Standard is applicable to all kinds of built assets, including buildings, infrastructure assets/civil engineering works	**RICS Whole Life Carbon Assessment for the Built Environment**
UK Green Building Council (UKGBC)	Delivering Low Carbon Infrastructure	Lots of resources on climate adaptation & mitigation	**www.ukgbc.org**
University of Oxford	Oxford Principles for Net Zero Aligned Carbon Offsetting	Provides guidance on how to integrate carbon offsetting into an organisational Net Zero strategy.	**Revised Oxford principles for net zero aligned carbon offsetting**

Table 9:

Training Resources

Organisation	Topic	Link
Institution of Civil Engineers (ICE)	ICE website hosts a number of webinars on what the PAS 2080 standard is, how to integrate it into the design process etc.	**ICE – Decarbonisation Resources**
Institute of Sustainability and Environmental Professionals (ISEP)	ISEP host a series of guidance documents and training courses to upskill on sustainability related topics, including more specialist training on Pathways to Net Zero and Carbon Footprinting & Reporting.	**Training Courses**
SME Climate Hub	Free training resources on identifying and addressing emissions from operational and supply chain activities.	**Action Space - SME Climate Hub**
Supply Chain Sustainability School	Free training resources tailored towards the built environment industry. Courses and webinars on a range of different sustainability and environmental topics.	**www.supplychainschool.co.uk**

Table 10:

Carbon calculation tools and emission factor sources

Organisation	Type	Topic	Link
ADEPT & DfT	Carbon calculator	Carbon Leadership Programme, supported by the Department for Transport. Supports local highway authorities in measuring emissions and identifying carbon reduction opportunities.	**CLP**
BRE Group	EPD/LCA Library	Provides environmental ratings for materials/products commonly used in building construction.	**BRE Green Guide**
Built Environment Carbon Database	EPD/LCA Library	Free-to-use repository of whole-life carbon assessments of built assets and product LCA data.	**BECD**
Circular Ecology & University of Bath	Emission factor database	Inventory of Carbon & Energy (ICE) database v4.1. Contains sector-average emissions factors for a variety of construction materials.	**ICE v4.1 Database**
Environment Agency (EA)	Carbon calculator	EA has developed a 'Cost and Carbon Tool (CCT)' to help its projects estimate and report on whole-life carbon emissions and their economic impact.	**carbonplanningtool@environment-agency.gov.uk**
Green Book Live	Lower carbon / responsible product library	Search for environmental products and services which have been approved under accreditations such as BES 6001.	**greenbooklive.com**
National Highways	Carbon calculator	V2.7 Carbon calculator for highways-related activities, and emissions factor library.	**Carbon emissions calculation tool**
One Click LCA	LCA tool	LCA and EPD software platform, tool to support whole-life carbon assessment in design.	**One Click LCA**
SME Climate Hub	Carbon calculator	Free-to-use carbon emission calculators, and SME reporting tool	**SME Climate Hub**
UK Government	Emission factor database	Greenhouse gas reporting: conversion factors. Annually-updated suite of carbon emissions factors to enable an in-house approach to carbon calculation.	**GHG Reporting Conversion Factors**
2050 Materials	Lower carbon / responsible product library	Platform containing product carbon data for various materials.	**2050 Materials Website**

Note: several consultancies offer paid-for calculation tools and services.



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