PAS 2080:2023

Carbon management in buildings and infrastructure

Construction Leadership Council

The Green Construction Board

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Foreword

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Supersession

PAS 2080:2023 supersedes PAS 2080:2016, which is withdrawn.

Information about this document

This is a full revision of the PAS, and introduces the following principal changes.

- Expanded scope to include all the built environment (buildings and infrastructure), with a focus on behaviours and good practice principles intended to complement existing standards/guidance.
- Clarifications to the role of value chain members with control of and influence on whole life carbon in the context of a net zero transition and systems-level change.
- Increased emphasis on a whole life carbon, aligned with a 1.5 °C global warming, circular economy principles, and the urgent need to decarbonize systems, networks and assets, while balancing capital carbon investment with operational and user benefit.
- Inclusion of requirements specific to procurement and to aid decision-making in projects and programmes of work.
- Consideration of other demands and co-benefits when managing carbon, such as climate adaptation and biodiversity net gain.
- More emphasis on the importance of leadership, governance and collaboration across the value chain and beyond, including guidance for government, regulators and financiers.
- Features to encourage consistent approaches across the built environment industry to collectively manage whole life carbon and support the net zero transition, while not conflicting with other existing standards, accreditation schemes, procurement notices, or similar.

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Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the *Shorter Oxford English Dictionary* is used (e.g. “organization” rather than “organisation”).

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Executive summary

At a time of a global climate emergency and with an international agreement to transition to a net zero carbon economy by or before 2050, PAS 2080 outlines a carbon management process that is applicable across both infrastructure and buildings, recognizing that they have key commonalities and are part of an interconnected system – the built environment. By following the PAS 2080 approach, value chain members across the built environment can work collaboratively towards the common goal of net zero carbon transition and achieve the following outcomes:

- align buildings and infrastructure projects and/or programmes of work, at the asset, network or system level, to the net zero transition by or before 2050, and therefore contribute to limiting global warming to 1.5 °C, as per Paris Climate Agreement 2015;
- reduce carbon and increase value across the whole life of buildings and infrastructure; and
- remove silos and create collaborative ways of working that promote innovation, encourage positive change for society and support economic development.

The 2013 *Infrastructure carbon review* [1] recognized the opportunity to create wider benefits through managing carbon in a consistent manner across the value chain. PAS 2080 was first published in 2016 and outlines a practical process to realize low-carbon outcomes. Its principles and claims of conformity have been adopted by several infrastructure organizations and, increasingly, developers and local authorities.

Targeted at leaders and all members of value chain organizations (asset owners/managers, designers, constructors and product/material suppliers) responsible for delivering built assets and networks, PAS 2080 provides a common process for the built environment value chain on how to manage whole life carbon in projects and programmes of work. PAS 2080 promotes reduced carbon, increased value delivery, more collaborative ways of working, and a culture of challenging convention and traditional practice for decarbonization.

PAS 2080 includes requirements for all value chain members to show leadership and establish effective governance mechanisms for reducing whole life carbon through a common management process. The individual value chain requirements are structured around:

- effective leadership;
- maximizing opportunities for whole life carbon reductions at all stages of the delivery process;
- selecting appropriate carbon emissions assessment methodologies;
- setting appropriate carbon reduction targets;
- determining baselines against which to assess carbon reductions;
- establishing metrics (e.g. key performance indicators – KPIs) for credible carbon emissions monitoring and reporting;
- integrating carbon management into procurement; and
- continual improvement of carbon management and performance.

PAS 2080 also sets out guidance for other value chain members – government, regulators and financiers – to illustrate the key roles these organizations play in the net zero transition, particularly to change behaviours. These are presented in Annex C.

The PAS is supplemented by the *Guidance document for PAS 2080*, which provides further practical guidance on how to implement the different requirements of this PAS and addresses current good practice through worked examples and case studies.

0 Introduction

0.1 The aim of PAS 2080

PAS 2080 is a specification for whole life carbon management when delivering projects and programmes in the built environment. The PAS supports the transition to a net zero carbon economy by 2050 and requires close collaboration across value chain members. It defines their contribution towards the net zero transition by developing and implementing, in a collaborative manner, the PAS 2080 carbon management process.

0.2 Buildings, infrastructure, and greenhouse gas emissions

Recently, there has been a step change in political and public perception of the impacts from climate change and environmental degradation. The urgency for action has been universally agreed with the COP21 Paris Agreement. At the time of writing (2023), national governments and the private sector are gearing up for transitioning to a net zero carbon world by or before 2050 that is also resilient to the unavoidable changing climate and enhances biodiversity net gain.

Consequently, the challenge for buildings and infrastructure (also referred to as "built environment" in this document) has shifted: work on every existing and new asset needs to contribute towards the urgent transition to net zero carbon. This requires a step-change transformation at the system level, driven collaboratively by all value chain members.

To date, carbon management in buildings and infrastructure has been largely managed separately. There are industry differences in terminology used to describe emissions sources (e.g., capital vs embodied carbon) and their materiality; there are different standards that buildings and infrastructure professionals use to assess whole life carbon; and different definitions for the stages of delivering projects and programmes work, among other differences. There has also been limited understanding of the carbon implications of land use change, circular economy principles, and the loss of ecosystems and biodiverse habitats. While PAS 2080 recognizes such differences in infrastructure and buildings, as the World Green Building Council points out, "infrastructure and buildings share key commonalities and are interdependent in use – it is important that we consider them together as part of a system" [2]. Accordingly, decarbonization should be carried out in alignment with net zero transition.

To better align the way decarbonization is managed in buildings and infrastructure, PAS 2080 sets some overarching principles to drive whole life carbon reduction, focusing on behaviours and good practices instead of specifics covered elsewhere. Some terms that are used to describe sources of emissions, for example, might more be familiar to buildings practitioners, while other terms might be more familiar to infrastructure practitioners. To provide clarity and avoid duplication, the terms and definitions use in this PAS are defined in Clause **3**.

The *Infrastructure carbon review* [1] and PAS 2080:2016 focused on the whole life carbon of all economic infrastructure and differentiated between carbon in the control and influence of asset owners/managers. Since then, the decarbonization principles have continued to mature.

The review of the UK's progress on decarbonization, published almost eight years after the *Infrastructure carbon review* [1], accentuated the need for the following actions (which have directly informed the scope of PAS 2080:2023):

- focusing on whole life carbon both within the control and influence of asset owners/managers, not just in creating assets, but also in their future operation and use;
- considering assets as part of complex, interconnected networks and systems;
- taking into account and integrating the carbon implications of climate resilience, environmental regeneration and biodiversity; and
- recognizing that most of the built environment expected to exist in 2050 is already built and has locked in high carbon behaviours, hence the need for retrofitting to decarbonize established built environment systems.

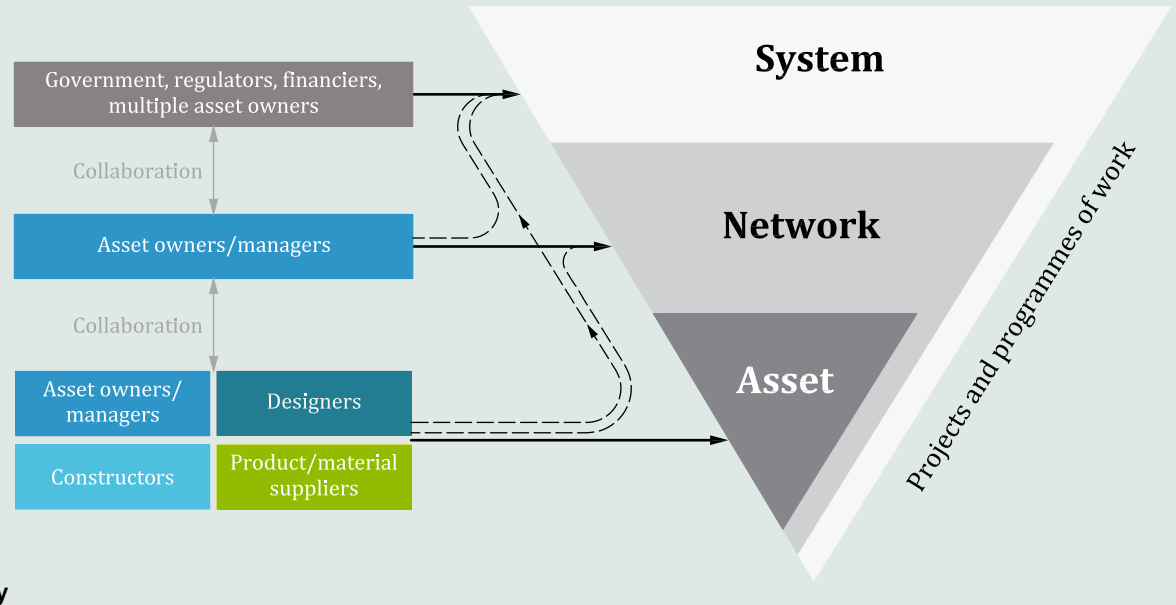
0.3 From assets to networks and systems

In the context of a net zero transition, it is essential that decarbonization is addressed from the system level downwards and through close collaboration across the value chain. PAS 2080 acknowledges this systems approach when setting out carbon management requirements and recognizes it is typically governments and regulators who have the greatest control at the system level – and, in some specific cases, major asset owners/managers.

Figure 1 graphically outlines the nested relationship of an asset within a network and a wider system, and the level of control and influence each member of the value chain has to drive whole life carbon reductions, recognizing that projects and programmes of work can be undertaken at each level.

PAS 2080 also recognizes that whole life carbon assessment is an essential part of managing to reduce carbon. Clarification is provided in Clause **4** and worked examples in the *Guidance document for PAS 2080* to drive the right behaviours and principles for decarbonization by all value chain members.

Figure 1 – Relationships between value chain members across assets, networks and systems



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 decarbonization, depending on the level at which they are operating.*

0.4 Decarbonization, resilience and environmental restoration

In striving for net zero, it is important that the value chain, especially asset owners/managers, recognize the complex interdependencies and synergies between decarbonization, other emergencies (e.g., climate adaptation, biodiversity loss), as well as the social and economic priorities in each context.

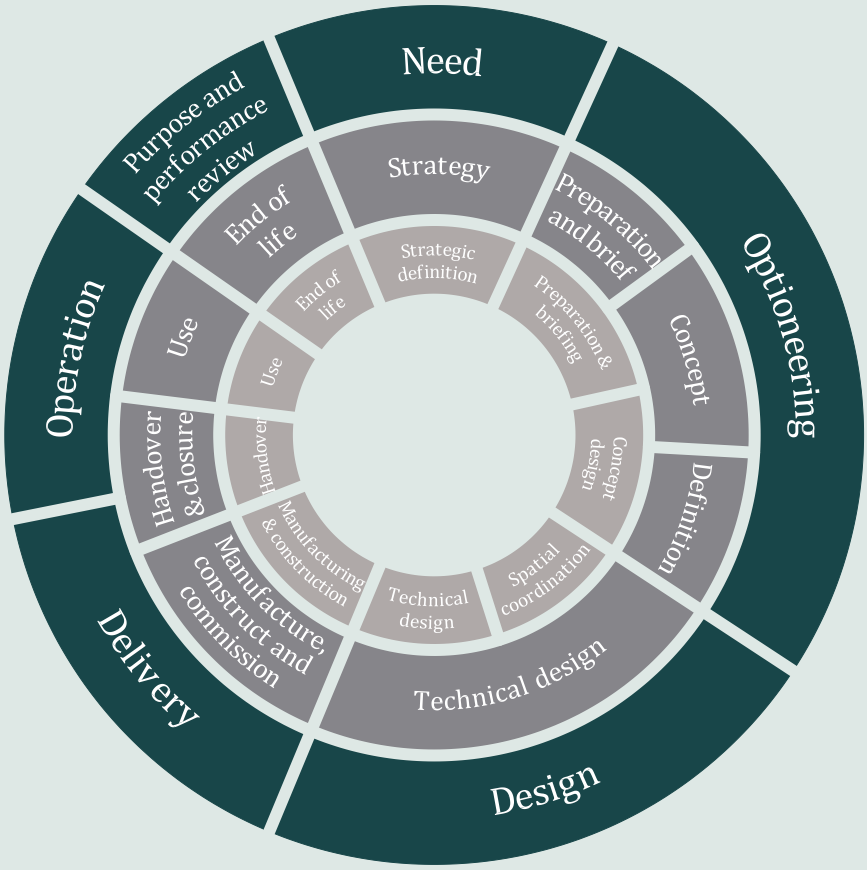
It is important that projects and programmes of work in the built environment address these challenges in a holistic way. The carbon management process outlined in PAS 2080 provides a systematic way to allow value chain members to place the relevant criteria (for the future benefit of our planet and society) at the centre of decision-making.

Further clarification on how to consider these aspects as part of the carbon management process is included in Clause **4** and Clause **6**, and in worked examples provided in *Guidance document for PAS 2080*.

0.5 Consistency in the built environment

Adopting consistent language across different sectors will help with resonating the principles of the carbon management process with all value chain members and stakeholders. Figure 2 proposes a unifying approach to compare well-established work stages in infrastructure and buildings, and indicates the terminology used in this document.

Figure 2 – Unifying work stages for projects and programmes of work



Key

- PAS 2080:2023
- BS 8536:2022
- RIBA Plan of Work

NOTE *This figure introduces work stages in PAS 2080 that are similar to those of the Value Toolkit (developed by the Construction Innovation Hub) [4]. For the purposes of this document, these stages map to the work stages of infrastructure (adapted from BS 8536:2022, with an additional "end-of-life" stage) and the work stages of the built environment (Plan of Work [5] developed by the Royal Institute of British Architects), as shown. There are other sector-specific definitions of work stages that differ from those shown in Figure 2, but this is not enough to hinder value chain members from implementing a carbon management process.*

1 Scope

This PAS specifies requirements for the management of whole life carbon in buildings and infrastructure – in the provision, operation, use and end of life of new projects and/or programmes of work, as well as the management or retrofit of existing assets and networks.

PAS 2080 is a specification to:

a) align the built environment with the transition to a net zero carbon economy by 2050;
b) encourage wider uptake of carbon management across the built environment;
c) promote close collaboration between all members of the value chain;
d) recognize the importance of systems in transitioning to net zero, clarifying the role of each value chain member to control and influence decision-making;
e) streamline consideration of influencing carbon beyond the project/programme boundaries;
f) emphasize the importance of the carbon reduction hierarchy for whole life carbon reduction;
g) take into account whole life carbon and circular economy principles when delivering/operating new or maintaining/repurposing/retrofitting existing assets/networks; and
h) integrate co-benefits and other emergencies/priorities as part of the carbon management and decision-making processes.

The scope of the PAS is summarized in Table 1.

Table 1 – PAS 2080 scope

PAS 2080 is about	PAS 2080 is not about
Managing carbon to reduce whole life emissions in the built environment, aligned with the net zero carbon transition and recognizing the importance of balancing climate adaptation and circular economy principles to bring wider co-benefits.	How to conduct a detailed appraisal of wider sustainability or environmental aspects[1)].
Consistency in the process of carbon management, including target setting, opportunities identification, assessment, use of data, procurement, continuous improvement, monitoring, reporting, leadership, governance and collaboration for decarbonization.	Prescriptive greenhouse gas (GHG) quantification/assessment methodologies and data gathering, as this is already addressed in other standards/specifications.
Consistency in framing whole life carbon reduction, both within the control and influence of the value chain.	GHG reporting against national accounts or a compliance methodology.
Decarbonization for increasing value: driving whole life carbon reduction that is compatible with the net zero carbon transition.	Whole life cost management or prescriptive guidance on how to manage decarbonization at national level.
Demonstrating capability for integrating carbon in decision-making when delivering projects and/or programmes of work, whether at asset, network or system level.	Organizational or corporate ESG (environmental, social and governance) certification.

[1)] While this standard is not about environmental or sustainability appraisals, it is important that the carbon implications of climate adaptation, biodiversity net gain and nature-based solutions are fully taken into account in the delivery, operation, use and end of life of projects and/or programmes of work. Failing to evaluate them together might risk conflict and unintended consequences across the systems.