

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

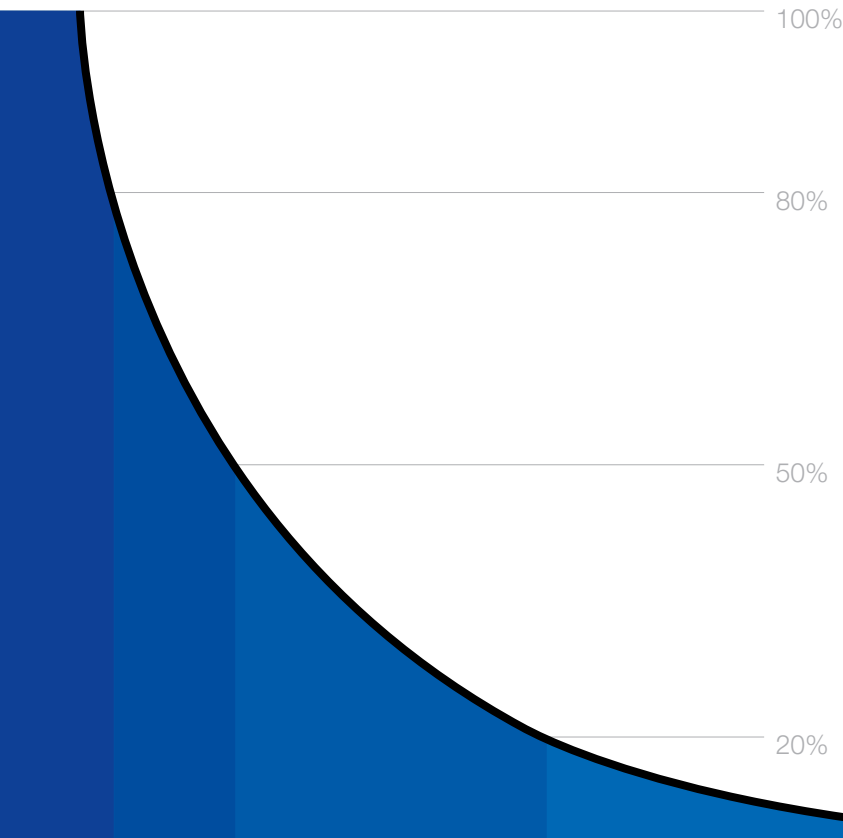
PAS 2080:2016

Carbon Management in Infrastructure



Construction
Leadership
Council

The **Green Construction Board**



bsi.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2016. Published by British Standards Limited 2016.

ISBN 978 0 580 90155 3

ICS 13.020.01

No copying without BSI permission except as permitted by copyright law.

Publication history

4th May 2016

Carbon management in infrastructure – Be part of it with PAS 2080

Reduce carbon, reduce cost and stay on top of it!



Construction
Leadership
Council

The **Green Construction Board**

with the generous support of the following organisations:



This is a preview of "PAS 2080:2016". Click [here](#) to purchase the full version from the ANSI store.

Contents

Foreword	iii
Executive Summary	v
0 Introduction.....	vi
1 Scope.....	1
2 Normative references	4
3 Terms and definitions	5
4 General Principles	9
5 Leadership and Governance	10
6 The carbon management process.....	12
7 Quantification of GHG emissions	17
8 Target setting, Baselines and Monitoring.....	24
9 Reporting	28
10 Continual Improvement	30
11 Assessment of carbon reductions.....	32
12 Claims of conformity	33
Annexes	
Annex A (Normative) Categories of carbon emissions in different infrastructure sectors.....	36
Annex B (Informative) Applying the carbon management process.....	43
Annex C (Informative) Bibliography	45
List of figures	
Figure 1 – Infrastructure is responsible for over half of the UK’s consumption GHG emissions.....	vi
Figure 2 – Process map summarising the key components of the PAS 2080 carbon management process and their respective clause numbers in this document.....	vii
Figure 3 – Infrastructure value chain members responsible for carbon management. The focus of PAS 2080 is on value chain members responsible for asset and programme level carbon management	2
Figure 4 – Conceptual diagram to showing ability to influence carbon reduction across the different work stages of infrastructure delivery	13
Figure 5 – Carbon management process	15
Figure 6 – Principal steps of GHG emissions quantification	17
Figure 7 – Modular approach showing the life cycle stages and individual modules for infrastructure GHG emissions quantification	18

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

List of tables

Table 1 – The scope of PAS 2080	1
Table 2 – Types of data for GHG emissions quantification	21
Table A 1 – Summary of infrastructure sector-specific descriptions of capital, operational and user carbon; this summary is high level and should be read in conjunction with Figure 7 and the specific descriptions documented in Annex A.....	38
Table A 2 – Before use stage	40
Table A 3 – Use stage	41
Table A 4 – End of life stage.....	42
Table A 5 – Supplementary information beyond the infrastructure life cycle.....	42
Table B 1 – Carbon management process responsibilities as they could be applied to an infrastructure asset and/or programme of work	44

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

Foreword

This Publicly Available Specification (PAS) was commissioned by the Green Construction Board (GCB). Its development was facilitated by BSI Standards Limited. It is published under licence from The British Standards Institution and came into effect on 4 May 2016.

This PAS was developed from a preliminary draft prepared by a Technical Authoring Team from Mott Macdonald and Arup, who have continued to support the development of the specification as members of the Steering Group.

Particular thanks are extended to the Carbon Trust for their pre-review contribution to the draft PAS and acknowledgement is also given to the following organizations that were involved in the development of this PAS as members of the Steering Group:

- Anglian Water Services Limited
- Arup Group Limited
- Balfour Beatty plc
- BRE Group
- Cambridge University
- CEMEX UK
- Clancy Group
- Construction Products Association
- Costain Group plc
- Department for Business, Innovation and Skills (BIS)
- HM Treasury
- High Speed Two (HS2) Limited
- J.N. Bentley Limited
- London Underground
- Mott McDonald
- MWH Global
- National Grid
- Responsible-Solutions
- SKANSKA UK plc
- Tata Steel
- Transport for London

Comments from other parties were also sought by BSI. The expert contributions from all the organizations and individuals consulted in the development this PAS, are gratefully acknowledged.

Publishing information

The British Standards Institution retains ownership and copyright of this PAS. BSI Standards Limited as the publisher of the PAS reserves the right to withdraw or amend this PAS on receipt of authoritative advice that it is appropriate to do so. This PAS will be reviewed at intervals not exceeding two years, and any amendments arising from the review will be published as an amended PAS and publicized in *Update Standards*.

The PAS process enables a specification to be rapidly developed in order to fulfil an immediate need in industry. A PAS may be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

Use of this document

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its methods are expressed as a set of instructions, a description, or in sentences in which the principal auxiliary verb is "shall".

The blue bordered boxes in clauses **5** through to **10**, each provides a short summary of the intention for its relevant clause but does not include specific requirements.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a PAS cannot confer immunity from legal obligations.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

Executive Summary

Working together, infrastructure organizations have the power to use PAS 2080 to transform the benefits that a national economy gains from its infrastructure systems and to provide a sustainable legacy. If all parties involved across the value chain work collaboratively, towards a common goal to reduce carbon, the following outcomes can be achieved:

- Reduced carbon, reduced cost infrastructure;
- More collaborative ways of working will promote innovation, delivering benefit to society and communities served by economic infrastructure;
- Effective carbon management in infrastructure will make an important contribution to tackling climate change and leave a positive legacy for future generations;
- Delivering more sustainable solutions, at lower cost, will enhance the reputation of the infrastructure industry, generating pride for those who work in it and attracting new people and skills;

The challenges set out in PAS 2080 will create a platform for innovation to thrive, leading to more vibrant and rewarding workplaces.

The Infrastructure Carbon Review recognized the opportunity and PAS 2080 will help the infrastructure value chain turn this into reality.

Targeted at leaders and practitioner-level individuals in different value chain organizations (asset owners/managers, designers, constructors and product/material suppliers) responsible for delivering infrastructure, PAS 2080 provides a common framework for all infrastructure sectors and value chain members, on how to manage whole life carbon when delivering infrastructure assets and programmes of work. Use of the PAS will promote reduced carbon, reduced cost infrastructure delivery, more collaborative ways of working and a culture of challenge in the infrastructure value chain through which innovation can be fostered.

- This PAS includes requirements for all value chain members to show the right leadership and to establish effective governance systems for reducing whole life carbon through the use of a carbon management process. The individual value chain requirements in the carbon management process are structured around the following components:
 - setting appropriate carbon reduction targets;
 - determining baselines against which to assess carbon reduction performance;
 - establishing metrics (e.g. Key Performance Indicators) for credible carbon emissions quantification and reporting;
 - selecting carbon emissions quantification methodologies (to include defining boundaries and cut off rules);
 - reporting at appropriate stages in the infrastructure work stages to enable visibility of performance; and
 - continual improvement of carbon management and performance.

All value chain members can claim conformity to PAS 2080 by demonstrating that relevant requirements set out in the different PAS clauses have been met. This will illustrate that the right organizational capability, for working collaboratively under a carbon management process to deliver low carbon assets and programmes of work, is actively in place.

The PAS is supplemented by the "Guidance Document for PAS2080" which provides practical advice on how to implement the different PAS requirements and addresses current good practice through worked examples and case studies.

This is a preview of "PAS 2080:2016". Click here to purchase the full version from the ANSI store.

0 Introduction

0.1 Infrastructure and greenhouse gas emissions

The Infrastructure Carbon Review (ICR)¹ showed that infrastructure is associated with over half of UK Greenhouse Gas (GHG) emissions:

- 30% of which are directly attributed to the construction, operation and maintenance of infrastructure assets (emissions that infrastructure directly controls); and
- 70% of which are attributed to the users of infrastructure (emissions over which infrastructure has influence)

Figure 1 illustrates the importance of infrastructure in relation to the overall challenge of reducing national carbon emissions targets.

Reducing carbon emissions associated with infrastructure is fundamental to addressing the global challenge of climate change.

PAS 2080 is applicable to anyone involved in the delivery of infrastructure, including asset owners/managers, designers, constructors and product/material suppliers.

Complying with the requirements of PAS 2080 will help all value chain members understand and manage carbon associated with the development of infrastructure from its inception to the end of its life and is equally applicable to individual assets or to programmes.

In this regard PAS 2080 is a specification for whole life carbon management and is not a detailed quantification protocol. As such it avoids the duplication of existing quantification protocols.

NOTE 1 The word 'carbon' used in this document is used as shorthand for GHG emissions as defined in Clause 3.18.

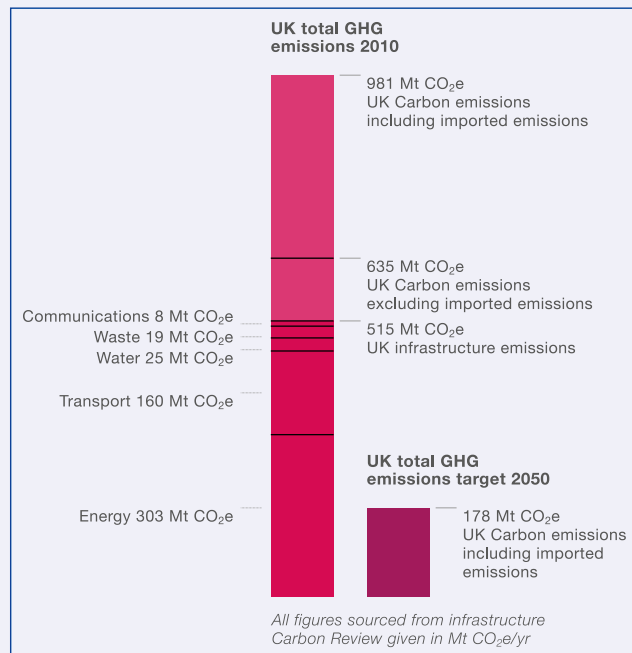
NOTE 2 Figure 1 GHG emissions outside the UK infrastructure sector include: transport related emissions from imported products; emissions from agriculture, land use change and industrial process emissions outside infrastructure. Readers should refer to the Infrastructure Carbon Review Technical Report for details of the GHG emissions attributed to the different infrastructure sectors.

PAS 2080 should be read in conjunction with the "Guidance Document for using PAS 2080"² which is designed to help practitioners implement the requirements of the PAS with the aid of real case studies and worked examples.

0.2 Whole life carbon and cost reduction

PAS 2080 sets out the general principles and components of a carbon management process, to promote carbon and cost reduction in infrastructure delivery on a whole life basis. The individual clauses of the PAS are arranged in accordance with the components illustrated in Figure 2 .

Figure 1 – Infrastructure is responsible for over half of the UK’s consumption GHG emissions

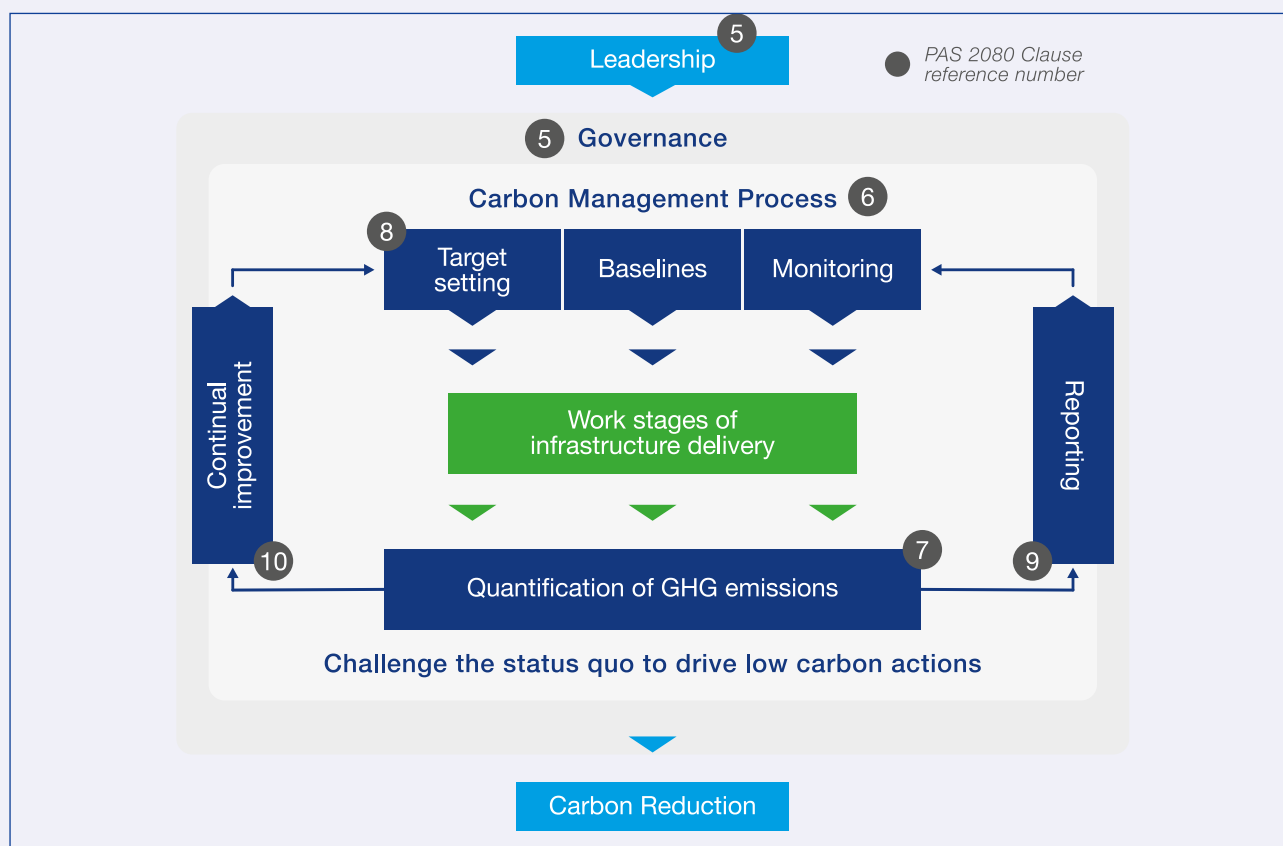


¹⁾ 2013 by HM Treasury, BIS and the Green Construction Board

²⁾ Published by the Green Construction Board, see www.greenconstructionboard.org.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

Figure 2 – Process map summarising the key components of the PAS 2080 carbon management process and their respective clause numbers in this document



NOTE to Figure 2: Clauses 1 to 4 are excluded from Figure 2 as they do not set out any requirements which directly relate to the carbon management process.

Achieving carbon reductions in infrastructure depends on robust leadership and governance and the integration of the key carbon management process components (i.e. baseline and target setting, monitoring, quantification, reporting and continuous improvement) into existing infrastructure delivery processes. Developing and implementing a carbon management process within infrastructure delivery processes will help join up the value chain, create a strong innovation culture, challenge the current status quo and thereby maximise reductions in both carbon and cost.

0.3 The aim of PAS 2080

The aim for PAS 2080 is that it should set out a carbon management process for use in infrastructure delivery that can be undertaken collaboratively, applied by all parties across the value chain and against which compliance can be either:

- monitored and self-validated by the applying entity; or
- assessed and validated uniformly by other parties or by independent certification bodies accredited to undertake certification services against PAS 2080, with the primary objective of reducing carbon emissions from infrastructure in a manner that also reduces cost.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

This page deliberately left blank.

This is a preview of "PAS 2080:2016". [Click here to purchase the full version from the ANSI store.](#)

1 Scope

This PAS specifies requirements for the management of whole life carbon in infrastructure – defined as the transport, energy, water, waste and communications, sectors – both in the provision of new infrastructure assets and programmes of work and the refurbishment of existing infrastructure.

The scope of the PAS is summarised in **Table 1**.³

Table 1 – The scope of PAS 2080

PAS 2080 is about:	PAS 2080 is not about:
Carbon management (as part of wider climate change mitigation).	Wider environmental or sustainability issues ³ .
Consistency in the use of data, reporting, quantification, benchmarking, target setting, continuous improvement, leadership, inclusion in BIM, etc.	Prescriptive approaches to quantifying GHG emissions, including the use of specific data or methods.
Management of capital and operational carbon under direct control of the value chain, and user carbon over which the value chain has influence.	Management of user carbon which relies on government policy or action, or where other parties are better placed to manage.
Promoting whole life cost reductions through whole life carbon reduction	Whole life cost management

Because of the evidence included in the Infrastructure Carbon Review that reduced carbon infrastructure is related to reduced cost, PAS 2080 has been developed to:

- Provide a specification for infrastructure carbon management which is compatible with international and sectoral norms, relevant existing standards and guidance, with the view of reducing whole life carbon in infrastructure delivery and;
- Bringing consistency to the practice of carbon management;
- Encouraging wider uptake and action on carbon management;
- Helping the infrastructure value chain to become more efficient – to reduce carbon and cost in infrastructure delivery;
- Improving the accuracy, transparency, consistency, relevance and completeness of carbon management and GHG emissions quantification;
- Improving the knowledge and understanding of carbon management by infrastructure practitioners throughout the value chain; and
- Supporting evidence-based decision making and identification of opportunities for carbon reduction.

Although asset owners/managers have the primary responsibility for delivering and managing infrastructure assets, all value chain members share responsibility for the management of the associated carbon emissions. Asset owners/managers can only realise the intended reductions within a fully integrated value chain involving designers, constructors and product/material suppliers.

To reflect this the PAS is applicable to all value chain members involved in the delivery of infrastructure, including asset owners/managers, designers, constructors and product/material suppliers. There are national and sectoral policies covering infrastructure carbon management, however these are mainly the responsibility of Governments and Regulators and are not in the PAS scope. **Figure 3** illustrates the value chain members involved in infrastructure management for whom this PAS is applicable.

³ While this standard is not about environmental or sustainability issues generally, it is important that such issues are taken into full account both in the provision of new infrastructure assets and programmes of work and the refurbishment of existing infrastructure assets.