Carbon Management in Infrastructure Project by PAS 2080

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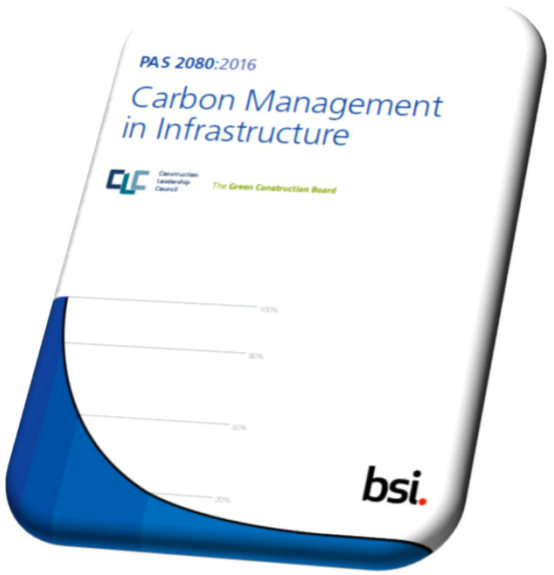
By Royal Charter

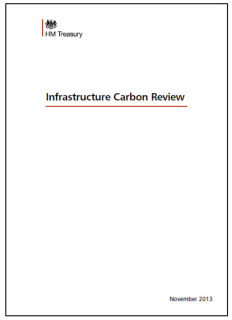
Agenda.

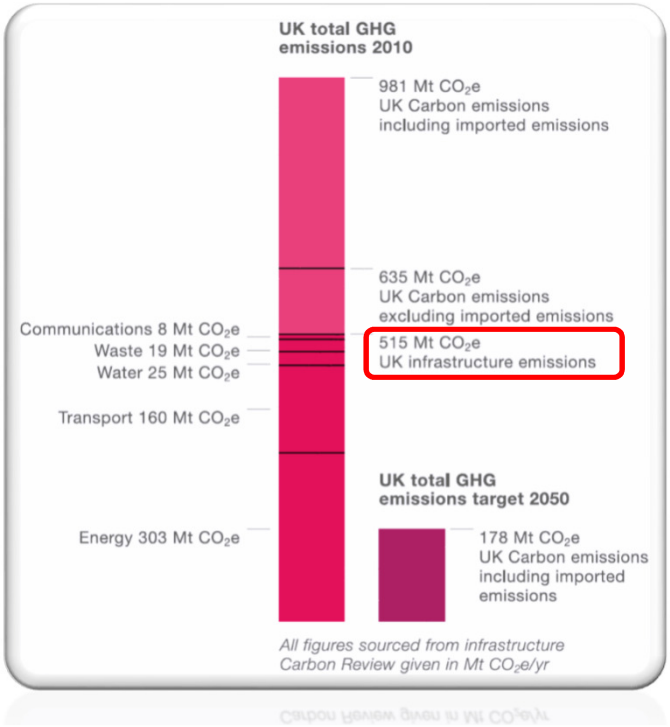
- Why PAS 2080? What is it for?
- What is it in PAS 2080?
- How does PAS 2080 mean to you?



From the very beginning – 'Why?'.

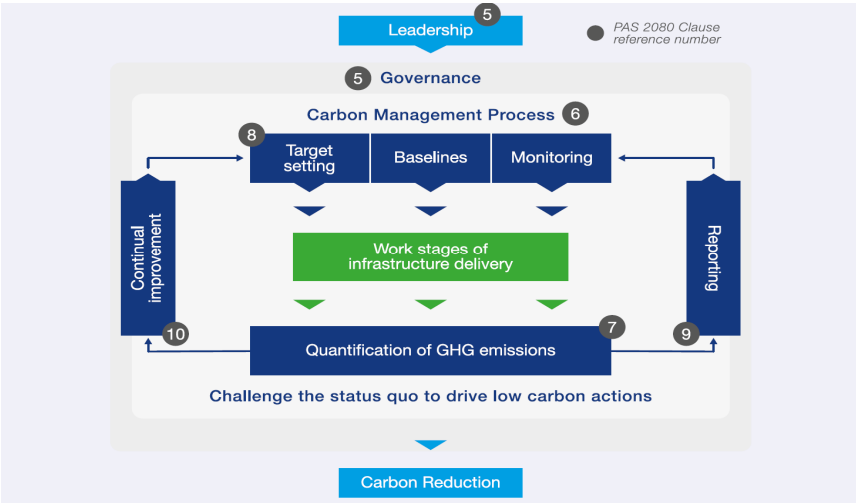
- The Infrastructure Carbon Review (ICR), HM Treasury, Nov 2013
- Infrastructure is responsible for 53% of the UKs GHG emissions
- Of which 30% is directly related to the construction, operation and maintenance of infrastructure assets *(direct control),* and
- 70% is attributed to the users of infrastructure *(influence)*
- A target of reducing UK emissions by 80% by 2050!
- Reducing emissions associated with infrastructure is fundamental





PAS 2080 overview.

- Commissioned in May 2016; was introduced to increase awareness and understanding of carbon management within infrastructure, including energy, water, waste, transportation and communications.
- Recognized the opportunity for infrastructure value chain participants to cooperate in the development of low carbon infrastructure projects – to manage **whole life carbon management**.
- Applicable to anyone involved in the delivery of infrastructure, including asset owners/managers, designers, constructors and **product/material suppliers**.
- Promotes best practice in carbon reduction, reduced infrastructure deliveries and costs, collaborative working and supply chain innovation.
- Specific requirements cover:
  - Leadership and governance (clause 5)
  - Carbon management process (clause 6)
  - Quantification of greenhouse gas emissions (clause 7)
  - Target setting, Baselines and monitoring (clause 8)
  - Reporting (clause 9)
  - Continual improvement (clause 10)
  - Assessment of carbon reduction (clause 11)
  - Claims of conformity (clause 12)



What the PAS 2080 user said…

"PAS 2080 provides a common framework and guidance for the whole value chain to tackle the carbon challenge.

It is essential for clients, designers, contractors and suppliers to work together if we are going to drive to drive a low carbon future."

Adam Crossley, Director of Environment

SKANSKA

Benefits of implementing PAS 2080.

Enhance business performance.
- Managing defined relationships within your value chain
- Streamline existing products and services to improve your business performance

Reduction in costs.
- Build collaborative business relationships that strengthen your processes to improve efficiency and reduce costs

Increase competitiveness.
- Implementing PAS 2080 can assist your organisation in gaining contracts in the UK and globally
- Due to the carbon management principles within PAS 2080, organisations will be viewed favorably by economies seeking to meet their international carbon reduction commitments

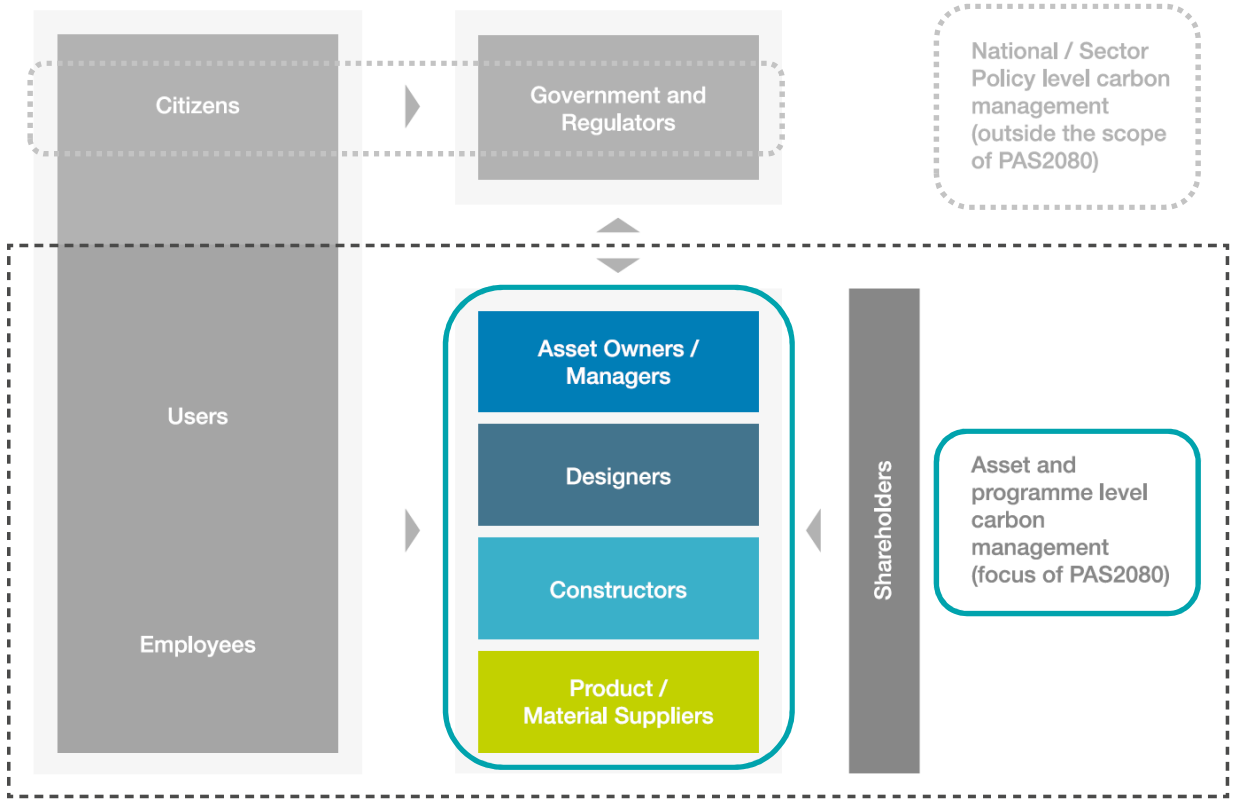
Improve innovation.
- Managing effective collaborative business relationships enables organisations to apply new infrastructure and service solutions that meet new or existing market needs

Transparency.
- Ensure that carbon is consistently and effectively quantified at key points
- Enable carbon data to be shared transparently along the supply chain

Know the 'Who' – Value Chain.

- Focus on four key parts of the **value chain**
- Each of these members has shared and own responsibilities in PAS 2080
- Responsibilities set out in each clause are arranged under the following headings:

a) Requirements for **ALL** value chain members;
b) Asset owner/manager requirements;
c) Designer requirements;
d) Constructor requirements; and
e) Product/material supplier requirements.



Roles & Responsibility.

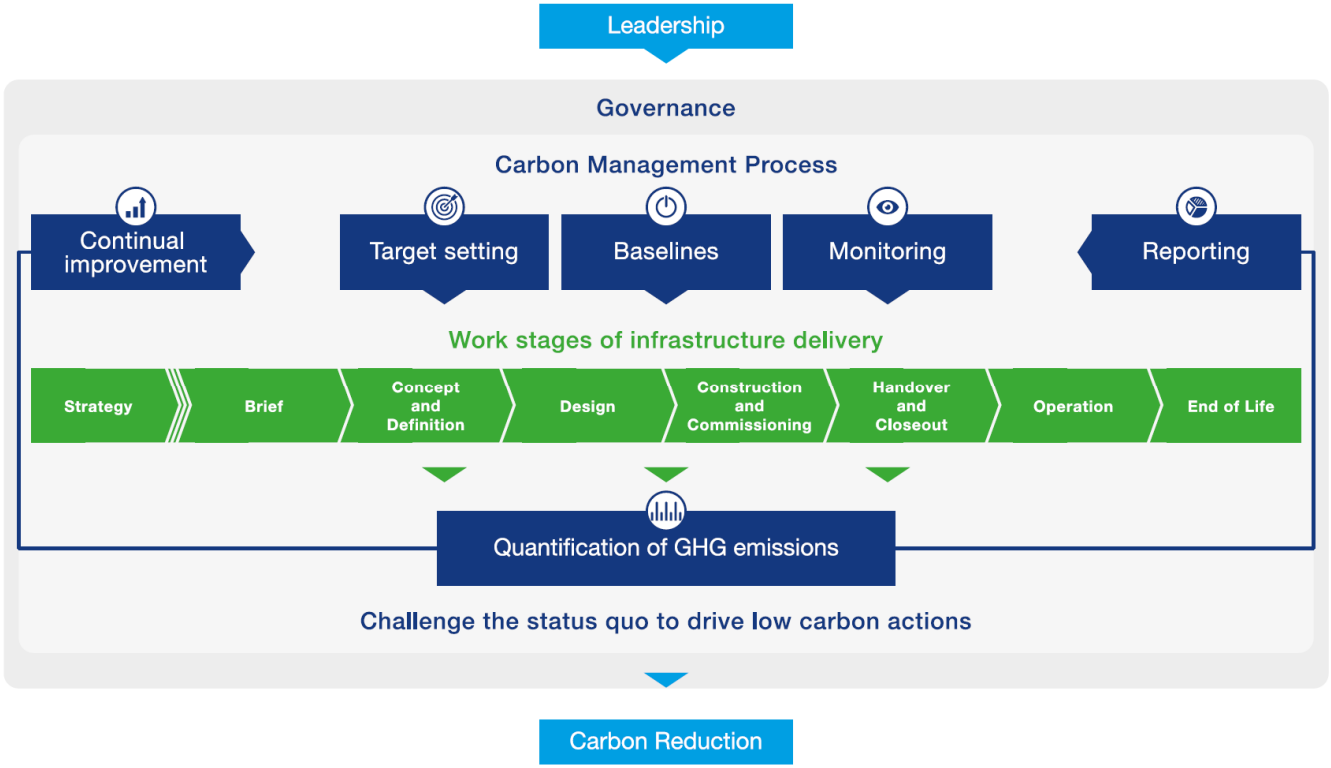
Suppliers

Practitioner	Responsibilities
Leadership Team	Understand the carbon objectives of asset owner/managers and ensure own organizational targets are aligned.
	Promote a carbon reduction culture through the organization and ensure technical teams have the appropriate training to develop low carbon solutions.
	Showcase their low carbon products/materials through the value chain.
	Ensure carbon management principles are integrated into delivery systems.
Procurement Manager	Embrace low carbon procurement criteria and cascade them to lower tiers of the value chain.
Material/Product Developer	Propose low carbon products/materials to the rest of the value chain for the best whole life carbon performance.
	Ensuring quantification methods are aligned with value chain requirements.

Practitioner	Responsibilities
Everyone	Understand the carbon management objectives of the organization are and how these affect their role.
	Take ownership of carbon management within their team to transfer organizational policy to day-to-day working practice.
	Engage with those in similar roles in value chain organizations to help share best practice and streamline processes.
	Engage with other internal practitioners to ensure alignment between working practices in terms of carbon management.

What is it in PAS 2080 – A carbon management process map.

- Developed by the Asset Owners/Managers
- Then, what next?

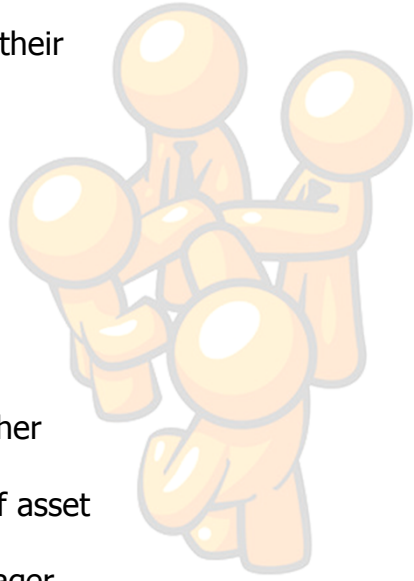


Obligations (requirements) in carbon management process.

- (6.1.) For **ALL** value chain members:-
  - Implement an organizational carbon management process
  - Meet carbon reduction targets
  - Manage whole life carbon and place priority on managing carbon emission that are under their control / direct influence

- (6.2.) For **Asset owner/manager** …
- (6.3.) For **Designer** …
- (6.4.) For **Constructor** …

- (6.5.) For **Product/material suppliers**:-
  - Unambiguously identify the part of their organization… to which the carbon management process is to be applied
  - Share details of their own carbon management process with asset owner/manager and other relevant value chain members
  - Propose improvements to asset owner/manager and encourage their use in the delivery of asset and program of work
  - Document the improvement proposal in evidence of their submission to asset owner/manager (supported by the anticipated benefits & record of outcome)



Responsibility Charting (RACI).

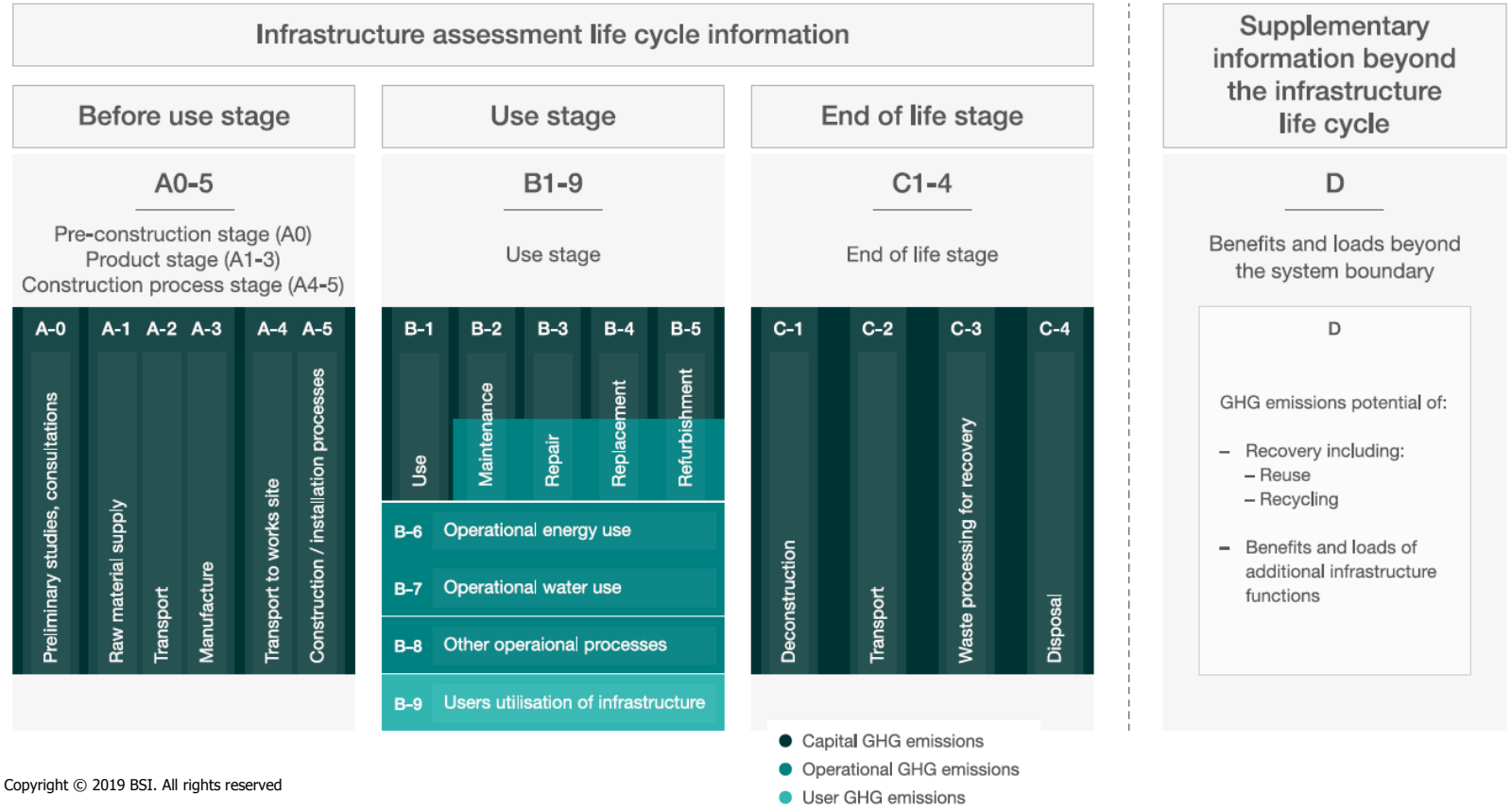
Level of responsibility of each activity are defined as:

- **R**esponsible – The Doer of the activity
- **A**ccountable – The value chain member accountable for ensuring the activity is completed to the level required
- **C**onsulted – Value chain member who is actively engaged and contributes input to the doer of the activity
- **I**nformed – Value chain member who is kept aware of how and when the activity is being completed and ready to provide inputs if necessary activity

A **RACI** chart summarizes how responsibilities are commonly split in infrastructure delivery (e.g. during Strategy work stage)

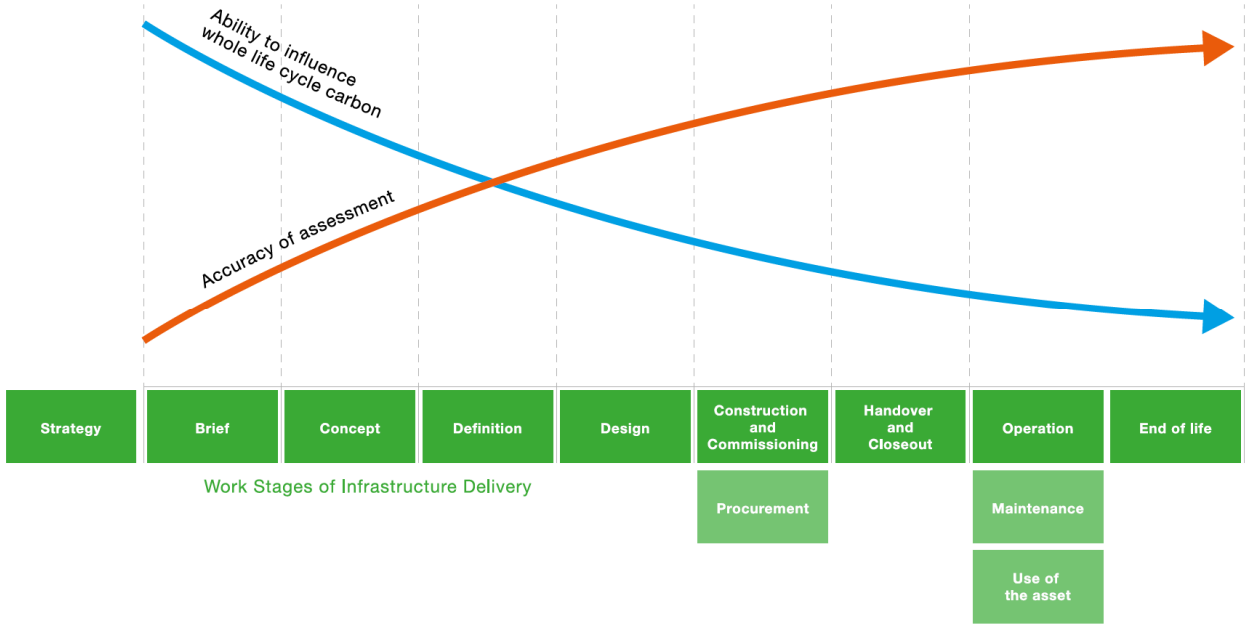
Carbon Management Process activities during Strategy work stage	Asset Owner/ Manager	Designer	Constructor	Product/ Material Supplier
Demonstrate **leadership** to **reduce carbon**	RA	R	R	R
Define infrastructure service outcomes including statement of need (define functional unit)	RA	C	I	I
Set up corporate **governance** that will include a continual improvement process	RA	C	I	I
Set **carbon reduction targets**; or other relevant ambitions related to carbon management	RA	C	I	I
Early engagement with value chain partners	RA	R	R	R

Quantification of GHG emissions.



Influence to carbon reduction.

- The approach taken to managing carbon, and the people involved may be different as delivery progresses
- At the earliest stages exists the greatest chance to reduce carbon and cost
- Scope for reducing whole life cycle carbon emissions is greater during the initial work stages (**stages Brief to Definition**) than in the later work stages (**stages Design to End of life**).
- Take early action!



Requirement summary @PAS 2080 Annex B.

Key to table	Asset owner/manager	Designer	Constructor	Supplier	All parties

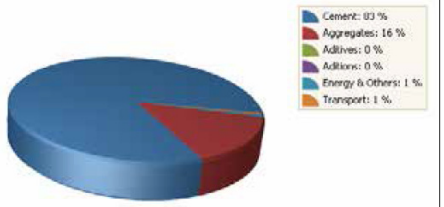
	Strategy	Brief	Concept	Definition	Design	Construction / Commissioning	Handover / Closeout	Operation / Use	End of life
Leadership and Governance	Set objectives for carbon management (in organization and/or asset or programme of work), aligned with business goals. Define roles and responsibilities. Establish robust governance framework for infrastructure delivery	Communicate governance framework throughout value chain. Communicate objectives and carbon reduction targets, internally and externally. Set incentives, where appropriate, to encourage desired behaviours. Assign staff to roles. Delegate internally/externally to deliver carbon management process requirements, as appropriate.		Ensure sufficient (and trained) resources to deliver the carbon management process requirements. Apply governance framework to ensure challenge at each work stage and throughout value chain, to achieve or exceed carbon reduction targets and to promote sharing of current good practice. Recognise and reward innovative behaviours.			Review carbon reduction performance, act on feedback and drive continuous improvement through better data collection, capturing current good practice in carbon reduction, etc.		
Target setting / Baselines / Monitoring	Set measurable targets to achieve objectives. Determine responsibility for carbon baselines.	Challenge carbon targets where there is potential for improvement Develop appropriate and realistic baselines				Capture construction data and feedback to help improve baselines		Capture operational data and feedback to improve baselines.	
Carbon reduction hierarchy	**Build nothing:** Challenge the need for an asset and explore alternative approaches to achieve outcomes that minimise whole life carbon.		**Build less:** Maximise use of existing assets. Optimise operational efficiency to reduce construction and whole life carbon		**Build clever:** Use low carbon materials/ products to minimise resource use and select technologies for efficient operation	**Build efficiently:** Embrace construction techniques that reduce resource consumption.		Operate, maintain (and decommission) efficiently.	
	Identify carbon hotspots in existing asset operation and opportunities for reduction.	Identify carbon hotspots in proposed solutions and opportunities/approaches for reduction. Assess opportunity to reduce capital, operational and user carbon.		Ensure impacts of design on the carbon emissions of construction, future operation and use are minimised.		Minimise material use, transport to site, construction waste and maximise opportunities for reuse/recycling/ recovery.		Minimise operational use of energy, transport, chemicals and other consumables in new or existing assets.	
		Share/develop/deploy low carbon solutions technologies, materials, products or methods to be incorporated into solutions							
Quantification	Set and communicate functional unit(s) for measuring performance. Define and communicate quantification requirements. Identify appropriate data sources. Review suitability of existing tools.	Develop and apply appropriate tools to aid quantification (asset owner/manager could delegate this responsibility).							
		Define goal, scope and assumptions. Establish scope & boundaries of GHG assessment. Select calculation methodology.	Collect and assess data. Calculate GHG emissions. Ensure options are assessed within consistent boundaries. Take account of forecast emissions in operation and use.		Undertake more detailed quantification of forecast GHG emissions, as required.	Assess actual GHG emissions from construction up to handover		Assess actual GHG emissions of operation (from actual activity data).	
		Share existing information on GHG emissions quantification of technologies, products and materials considered or used.			Quantify GHG emissions of materials/products supplied, as required				
Reporting	Define reporting requirements and communicate throughout value chain.		Capture data on innovative approaches, technologies, materials and products to be used. Report forecast emissions and performance against targets, in accordance with general principles and reporting requirements.			Capture data on innovative construction techniques, materials and products used. Report actual emissions and performance against targets, in accordance with general principles and reporting requirements.		Report actual emissions and performance against targets, in accordance with general principles.	
		Provide reporting on the performance of technologies, materials and products (to be) used.							
Opportunity to reduce carbon	Highest						Lowest		

Case study (a material supplier).

- Early engagement with material suppliers in the value chain is important to consider **innovative and potential carbon reduction initiatives**.
- **CEMEX UK** (a material supplier of concrete) has developed a Carbon Footprint Tool (CO_2 Tool) which allows CEMEX to accurately estimate the embodied carbon of its concrete.
- The tool follows the principles of PAS 2050 and the cement input data, the key contributor of embodied carbon in concrete, being externally verified to PAS 2050.
- CEMEX can use the output of the tool to support asset managers on alternative solutions and methods to deliver carbon reduction targets to support low carbon solutions.
- A standard concrete mix could have an embodied carbon figure of 338 $kgCO_2e/ m^3$.
- With early engagement the embodied carbon figure could be reduced using alternative concrete mix designs to support low carbon solutions, in this example to 248 $kgCO_2e/m^3$.

CO2 FOOTPRINT RESULTS

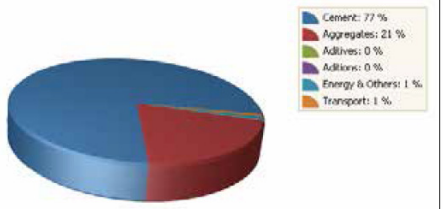
Name	tCO2 eq/m3	%
Cement	0.280632	83.0
Aggregates	0.052845	15.6
Aditives	0.000000	0.0
Aditions	0.000000	0.0
Energy & Others	0.002548	0.8
Transport	0.001895	0.6
TOTAL	0.337920	
Density (ton/m3):		2.305000
Total (tCO2 eq/ton):		0.146603



Footprint 0.338 tCO_2 eq/m^3

CO2 FOOTPRINT RESULTS

Name	tCO2 eq/m3	%
Cement	0.190259	76.9
Aggregates	0.052597	21.2
Aditives	0.000289	0.1
Aditions	0.000000	0.0
Energy & Others	0.002548	1.0
Transport	0.001864	0.8
TOTAL	0.247558	
Density (ton/m3):		2.268200
Total (tCO2 eq/ton):		0.109143



Footprint 0.248 tCO_2 eq/m^3

Again, what PAS 2080 is and isn't.

PAS 2080 is about	PAS 2080 is NOT about
Is **a specification** that provides a consistent framework for managing carbon	**NOT a standard** for quantifying carbon
Is **complementary**. It is designed to work with PAS 2050 (Product carbon footprint) and the existing suite of carbon quantifying standards, as well as BIM and information management standards in order to integrate carbon management into industrywide practices and developments	**NOT regulatory**. It provides guidance that allows industry professionals to develop and adopt best practices according to business, asset and position within that asset's lifecycle
Consistency in use of data, reporting quantification, benchmarking, target setting, continuous improvement, leadership, inclusion in BIM, etc	**NOT prescriptive approaches** to quantifying GHG emissions, incl. use of specific data or methods
Management of capital and operational carbon **under direct control** of value chain, and user carbon over which value chain has **influence**	**NOT** 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**	**NOT** whole life cost management

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