Infrastructure Carbon Review
Two years on...

Reducing carbon reduces cost
Climate change affects us all, and last December in Paris the world agreed to take collective action to limit global temperature rises.

The UK has always been at the front of the charge against climate change, and has a legally-binding commitment to achieve an 80% reduction in greenhouse gas emissions by 2050.

Infrastructure accounts for around 53% of the UK’s greenhouse gas emissions, so action in this sector is crucial if we are to meet our domestic and international aims. It is a challenge the Construction Leadership Council recognises, and our ambition is to achieve a 50% reduction in greenhouse gas emissions in the built environment by 2025.

The Infrastructure Carbon Review (ICR), launched in November 2013, provides the framework for action and remains as important today as it was three years ago. The ICR identified the potential to reduce up to 24 million tonnes of carbon every year from the construction and operation of the UK’s infrastructure assets by 2050, and in the process to achieve a net saving of £1.4 billion.

Focusing on cutting carbon encourages the development and adoption of new technologies, innovative construction techniques and the use of low carbon materials, which can all help improve productivity in the sector – in a phrase: Reducing carbon reduces cost.
Statement of Endorsement

We endorse the Infrastructure Carbon Review and agree that the infrastructure sector should pursue lower carbon solutions that also cost less.

We will play our part within the value chain, and therefore commit our organisations to releasing the value of lower carbon through:

Leadership
To create the environment and the imperative for change

Innovation
To be the engine of change

Procurement
To provide the mechanisms that enable the supply chains to respond

We agree that where it can reduce costs to the taxpayer and consumer, Government and industry clients should work together to incorporate carbon reduction objectives within their infrastructure projects and programmes by 2018.

Nick Bates
Minister of State for Skills

Andrew Wolstenholme
CEO Crossrail

Chris Newlove
Director for Asset Management, Anglian Water

Co-chair, Construction Leadership Council

Co-chair, Construction Leadership Council

Chair, Green Construction Board

Infrastructure Working Group

---

Munir Allen
UK Power Networks

Andrew Wyllie
Costain

Paul Bentley
JR Bentley

Andrew McNaughton
Balfour Beatty

---

Chris Newlove
Anglian Water

David Pizzey
Carillion

Mike Purum
Bunzl

Saamus Keogh
The Clancy Group

---

David Bevan
Galliford Try

Gary Wells
Laing O’Rourke

John Pettigrew
National Grid

Julia Powell
Defence Infrastructure Organisation

---

Joe Burns
Kier Infrastructure

Graham Nicholson
Tony Gee and Partners LLP

Andy Dix
British Precast

Lawrence Golden
Thames Water
Statement of Endorsement

The Construction Leadership Council

The Construction Leadership Council (CLC) draws together a number of senior business people from across the construction sector.

It was set up to provide the leadership which will help to create radical transformation of the UK construction industry and position it as a driver of productivity across the economy.

To achieve this, the Council has two primary functions:

- To deliver against the aims of the strategy for the future of the UK construction industry - Construction 2025
- To advise government and the Construction Minister on key construction related matters.

The Construction 2025 Vision

PEOPLE: An industry that is known for its talented and diverse workforce

SMART: An industry that is efficient and technologically advanced

SUSTAINABLE: An industry that leads the world in low-carbon and green construction exports

GROWTH: An industry that drives growth across the entire economy

LEADERSHIP: An industry with clear leadership from a Construction Leadership Council.

www.gov.uk/government/groups/construction-leadership-council

This conference and the PAS demonstrate how industry is willing to show clear leadership to tackle climate change. I want to warmly thank the many industry participants involved in the development of the PAS.”

Mike Putnam, Chair of the GCB and President & CEO of Skanska UK
PAS 2080 Infrastructure Carbon Management and Guidance Document

A first in specifying the management of carbon in economic infrastructure

PAS 2080 is aimed at leaders and practitioners in organisations within economic infrastructure who want to be part of delivering reduced carbon, reduced cost and more sustainable solutions.

Carbon is an excellent proxy for the materials and energy used in constructing and maintaining assets that we all use on a daily basis. With infrastructure being responsible for over half of the UK’s carbon emissions, the future reductions we will deliver will leave a sustainable legacy for future generations.

The Publicly Available Specification (PAS) sets out the general principles and components of a carbon management system and requirements on the collective and individual parts of the value chain, as illustrated in the diagram below.

Individual parts of the value chain including clients, constructors, designers and material suppliers can be certified to PAS 2080.

Infrastructure solutions that significantly reduce carbon and reduce cost will be delivered when all parts of the value chain take action to follow this PAS.

For details of the new PAS 2080 specification, the accompanying guidance document and information about how to order copies visit the GCB website at: www.greenconstructionboard.org

The world's first specification for managing whole life carbon in infrastructure

The opportunity to reduce carbon and cost is greatest in the initial work stages of infrastructure delivery. Action to reduce carbon needs to therefore be taken early in the delivery process even if the degree of accuracy is still low.
Modern infrastructure shapes our lives. And it drives the economies of the world.

Our transport systems; our water supplies; the electricity that powers and heats our homes; the communications technology that keep us in touch with friends. But as our lives become increasingly dependent on this infrastructure we face some critical global challenges.

In short, how we can continue to develop the infrastructure that underpins society while living within the planet’s resources. How can we accommodate a growing global population while at the same time meeting our carbon reduction targets of cutting carbon emissions by 80% by 2050 and so curb climate change for future generations?

They are tough challenges. But there are solutions - and carbon is the key. As the new ICR infographic from the Green Construction Board makes clear, measuring and managing the amount of carbon we use to run our critical infrastructure is critical.

Carbon is a clear proxy for raw materials, the energy we use and therefore cost. So across infrastructure, “reducing carbon reduces cost”. Watch the new ICR infographic to find out how you can start your low carbon journey today.

PAS 2080 - Infrastructure Carbon Management

PAS 2080 provides the impetus to collectively reduce carbon emissions within infrastructure

We are now seeing more evidence of leadership across the infrastructure value chain in delivering reduced carbon reduced cost solutions. The Green Construction Board’s Infrastructure Working Group is determined to maintain this momentum being built by the work of organisations illustrated throughout this two years on report.

While the benefits defined within the ICR are understood, our next challenge is to embed the process of carbon reduction firmly within our organisations and deliver the benefits we need to remain competitive and sustainable.

The leadership and impetus to collectively reduce carbon emissions within infrastructure.

PAS 2080 and the associated guidance document now takes this a step further, giving the industry the clear process for managing and reducing carbon and cost together, with case studies and worked examples bringing this process to life.

**Chris Newsome**

Member of the Green Construction Board, Chair of the Infrastructure Working Group and Asset Management Director, Anglian Water.

“While the benefits defined within the ICR are understood, our next challenge is to embed the process of carbon reduction firmly within our organisations”

Chris Newsome.

**Infrastructure Carbon Review: the infographic**

Reducing carbon reduces cost

New video infographic explains the challenges and solutions

Modern infrastructure shapes our lives. And it drives the economies of the world.

Our transport systems; our water supplies; the electricity that powers and heats our homes; the communications technology that keep us in touch with friends. But as our lives become increasingly dependent on this infrastructure we face some critical global challenges.

In short, how we can continue to develop the infrastructure that underpins society while living within the planet’s resources. How can we accommodate a growing global population while at the same time meeting our carbon reduction targets of cutting carbon emissions by 80% by 2050 and so curb climate change for future generations?

They are tough challenges. But there are solutions - and carbon is the key. As the new ICR infographic from the Green Construction Board makes clear, measuring and managing the amount of carbon we use to run our critical infrastructure is critical.

Carbon is a clear proxy for raw materials, the energy we use and therefore cost. So across infrastructure, “reducing carbon reduces cost”. Watch the new ICR infographic to find out how you can start your low carbon journey today.

www.greenconstructionboard.org
Infrastructure Carbon Review - Success Stories

ACO is a world leader in the design, development and implementation of sustainable surface water management systems. For over 50 years, ACO have pioneered unique solutions that satisfy the need for high performance, environmental excellence, optimal return on investment and long operational life across a vast range of applications.

Success story: Stormwater management
ACO StormBrixx is a unique and patented plastic geocellular stormwater management system. Designed for surface water infiltration and storage, its versatility allows it to be used in applications across all construction environments. The unique open cell structure permits completely free access for easy and complete maintenance but is also designed to give very significant benefits in both installation and carbon reduction. Delivery, site logistics and installation are made easier as a result of the stackable design. Every unit optimizes logistic and installation costs significantly whilst also reducing the carbon footprint of the product by up to 75% compared to traditional solutions.

Commitment 1: We will nominate an Executive Director who will have responsibility for driving the carbon reduction agenda in our organisation

Commitment 2: We will undertake a full, independently audited, organisational carbon footprint for a 12 months period (1 full year) This work will be in accordance to the World Resources Institute Greenhouse Gas Protocol Standard and will include GHG Protocol Scope 1 + Scope 2 in full.

Commitment 3: We will produce an independently audited ‘cradle to gate’ EN 15804 compliant product carbon footprint for an ACO product range
This will include:
- Raw material production
- Manufacturing and fabrication activities
- Transportation at all stages in the supply chain
- Primary packaging.

Commitment 4: We will establish an internal network of sustainability champions that will promote carbon reduction in all aspects of our business

Commitment 1: To continue to set stretching carbon targets (extending the 50% target we set for AMP 5)
In 2015 we delivered a 54% (@One Alliance 55%) reduction in carbon capital against our 2010 baseline. A challenging goal successfully delivered through the commitment and innovation of our supply chain. We also exceeded our operational carbon target, delivering a further 6% reduction over and above our target against a 2010 baseline. We have updated our capital and operational carbon targets:
- Exceed a 7% reduction in real terms in gross operational carbon by 2020 from a 2015 baseline.
- Deliver a 6% reduction in capital carbon by 2020 from a 2010 baseline.

Commitment 2: To develop measurement and visualisation tools that support teams in reducing carbon
Through 2013, over 1300 capital carbon models were updated against the latest available information from suppliers and academia, including emission factors, materials and construction techniques. These revised models were used in building up the capital carbon baseline for our 2015-2020 business plan. In 2015 Anglian Water launched its new carbon and water footprinting modeller. The modeller enables engineers across the supply chain, to optioneer between designs and identify the lowest carbon impact. Training videos illustrating the tool can be found on YouTube by searching Anglian Water carbon modeller.

Commitment 3: To set carbon targets for our supply chain and make them an integral part of our performance structure.
We continue to encourage our supply chain to certify to a carbon measurement and reporting scheme such as CEMARS or Carbon Trust Standard. In July 2015 Anglian Water organised and hosted a carbon and energy leaders conference. Participants at the conference included representation from across our value chain, with speakers and panel debates from our investors, CEO, Anglian Water Directors, supply chain partner directors and the then Chief Construction Advisor to UK government. The theme of the conference was around collaboration, innovation and transformation in delivering reduced carbon and reduced cost solutions. In October 2015 the @one Alliance ran a ‘Carbon Week’ to re energise the carbon reduction initiative. Each day of the week followed a theme relating to a source of carbon emissions with posters and activities targeted at understanding and reducing these. A range of ‘Carbon Quick Guides’ for the different resources were produced and to further promote carbon literacy representation of different units of CO2 at atmospheric pressure were located around the office including a structure representing 1 tonne CO2 in the car park. The resources from the week continue to be available in the ‘one stop shop’ Sustainability in Design web portal created following the event.

Success story: Low carbon concrete in Norwich
Cemfree, a low carbon concrete comprising a mix consisting of 95% ground blast furnace slag (GGBS) was used in a kiosk base at a site in Kirby Cane, Norwich. This replaced a standard RC28/35 concrete mix resulting in an approximately 70% reduction in carbon over the comparable concrete slab used in our 2010 baseline year. We are the first company within the water industry to work with Cemfree and only the second ever company to use Cemfree in an operational setting.

The Anglian Water region is particularly vulnerable to the impacts of a changing climate and has one of the fastest growing populations in the UK, putting increased pressure on our environment. Minimising both the ‘operational’ carbon created in our everyday operations, and the ‘capital’ carbon used in building assets such as water mains, sewers and pumping stations, is vital to reducing our overall impact. Fundamentally, tackling carbon makes good business sense, reduce carbon reduce cost.

Success story: Stormwater management
ACO is a world leader in the design, development and implementation of sustainable surface water management systems. For over 50 years, ACO have pioneered unique solutions that satisfy the need for high performance, environmental excellence, optimal return on investment and long operational life across a vast range of applications.
Infrastructure Carbon Review - Success Stories

Commitment 1: Effective leadership
The leadership of Arup has a clear vision of carbon reduction and has pledged to keep the world on a trajectory that keeps us within 2 degrees as a signatory of the Paris Pledge at COP21. This supports a commitment to reduce greenhouse gas emissions to a safe level, while building resilience against those changes already occurring. Chairman of Arup Group, Gregory Hodkinson, set out in an article in the Guardian why cities need to take urgent action and that “we have one generation to save our cities” from the risk of climate change. Arup’s “Sustainability Policy” is based on the mission to “shape a better world” and promote economic security, social betterment and environmental stewardship and strive for continuous improvement of performance in these areas with regards to its core business, its people, its facilities, and its external relationships. The Arup Group Strategy sets out a clear ambition for Arup to tackle the most pressing energy challenges through “balanced solutions designed to optimise the ‘energy dilemma’ – availability, environmental impact and affordability”.

Commitment 2: Culture and communication
Arup has written papers with C40 Cities Group to plan climate actions in 59 C40 cities globally, further analyse mayoral powers and identify major trends across sectors and geographies. With increasing urbanisation cities and supporting infrastructure are our future. However, with the increase in urban growth, cities are as vulnerable as they are powerful. Arup and C40 identified Climate Actions for Megacities (CAM 3.0), which provides a roadmap on how to achieve sustainable progress of emissions reductions and climate resilience through a cooperation of businesses, civil societies, and governments.

Commitment 3: Metrics and governance
Arup has tools and processes in place to facilitate the calculation and reduction of carbon emissions. Arup reports on ‘early design’ emissions which can act as a baseline on which design improvement and carbon savings will be measured against. Arup has developed CO2ST, an infrastructure carbon tool, and also uses client tools where possible, i.e. carbon tool from RSSB, Environment Agency, Transport Scotland, Highways Agency, etc. Construction emissions are just as important as operational emissions. Arup analyses opportunities to implement measures as part of our optioneering activities to reduce the embodied carbon of materials specified.

Commitment 4: Innovation and standards
Arup co-authored PAS 2080: Carbon Management in Infrastructure. The Publicly Available Specification shows how carbon in infrastructure can be managed more rationally and strategically. PAS 2080 will establish a common understanding, approach and language for whole life carbon management in the provision of economic infrastructure (defined as water, energy, transport, communications and waste sectors). As the world’s first low carbon infrastructure specification, it could eventually form the basis of an international standard (ISO).

Commitment 5: Commercial solutions
Arup won four of the Institution of Structural Engineers’ Structural Awards in 2015. All four awards are based on creative solutions with holistic approach, with one award specifically in the sustainability category. One of the awards was the Supreme Award, which was for the Singapore Sports Hub, which set a new benchmark in efficiency of design and material usage - and the 310m span roof uses a third of the weight of steel that would normally be used in a span of this distance. The structure is part of Singapore’s urban development project to promote a more sustainable, healthy and active society. The Sustainability Award was for Housing for Low-Income Communities in El Salvador, a project to develop an alternative form of permanent, low-cost and appropriate housing for low-income communities in El Salvador. The design uses renewable materials such as timber and cane.

Success story: Delivery of new city district
Arup worked with Allies and Morrison Architects on this proposed new mixed-use development located close to Muscat International Airport in Oman. The Masterplan is an exemplary urban centre - both a local and global model for city development, a benchmark for a truly sustainable infrastructure. Total forecast carbon emissions over a 20 year lifespan are 40% fewer than the base case.

Commitment 1: Make carbon reduction a requirement on all our major projects and programmes by 2016
Our project management approach stipulates that risk assessments are conducted, to identify risks and develop mitigating strategies. Some of our risk assessment prompts relate to activities which impact on our carbon footprint. We are developing a Design4Life training programme that will encourage our designers to consider whole life cycle carbon issues during the design process. One of our technical networks focuses on carbon critical issues in relation to buildings. We’ve used a series of webinars to open a dialogue with our people about how carbon related issues can add value to the projects we deliver. We’re reducing the energy we consume in our offices by consolidating office space and introducing agile working. Improved telecommunications and video conferencing have helped us to reduce travel related emissions. In addition, our office sustainability programme, RACE2, provides guidance and encouragement about further energy reduction measures to those working in our offices.

Commitment 2: Build carbon reduction into our procurement requirements
Our “Partnering with our Supply Chain” policy outlines our commitment to considering sustainability related issues, alongside other factors, in the way we view suppliers’ services.

Commitment 3: Define clear low carbon targets and be responsive to innovation offered by the supply chain
As a consultancy, much of our carbon impact is driven by the instructions of our clients, so the process of setting targets is extremely complex. We are, however, very supportive of innovation, both inside our own organisation, where we have established a network of innovation hubs, and within our supply chain.

Commitment 4: Nominate a main Board member who will have express responsibility to drive the carbon reduction agenda
Neil Thomas is the Group Technical and QSSE (Quality, Safety, Security and Environment) Director, and reports to the CEO.

Commitment 5: Use the carbon maturity matrix to identify areas for development and to implement an action plan for driving that improvement
We participate in the CDP (formerly Carbon Disclosure Project). As reported by CDP, we’ve continued to reduce our emissions every year over the last three years. Our score has risen from 81 in 2012 to 93 in 2015. This is a testament to our continuing work on low carbon master planning and advisory services, which is helping governments, regional authorities and clients across the world, make the transition to a low carbon economy.

Success story: Flexible design for Lowestoft Sixth Form College
This project links a network of informal spaces for students, and works on the principle that any space can become a learning space. Our design maximises passive low-carbon design features, minimising the need for more costly renewable technologies, and targets 67% less energy consumption and 62% less carbon emissions annually than similar buildings.
Infrastructure Carbon Review - Success Stories

BAM Nuttall is over 150 years old. We have always been focused on delivering safe, high quality projects on time and within budget. We always look to reduce waste, increase efficiency and add value in everything we do. We are committed to providing low cost and low carbon solutions and believe it can, and should be, done, as part of a dynamic transition to a low carbon future for all.

Commitment 1: Reducing the carbon emissions of our projects through effective engagement with our clients and supply chain

In the design phase we consider ways to reduce embodied carbon and use industry standard tools to help us. Projects in construction have environment and sustainability plans that incorporate actions to reduce energy and carbon. We support the sustainability supply chain school and regularly engage with suppliers through the school on carbon management. We have a sustainable procurement policy that requires suppliers to demonstrate how they are effectively managing carbon on our behalf through the goods and services they provide.

Commitment 2: Providing carbon reduction assessments for alternative offers and solutions

Our “Partnering with our own Supply Chain” policy commits us to taking into account sustainability related issues, alongside other factors, in the way we view suppliers’ services. It also encourages suppliers, where appropriate, to work towards or maintain ISO 14001. These requirements are defined within our business management system, which has been developed to meet the needs of our customers, contracts and our businesses.

Commitment 3: Defining clear low carbon targets and being responsive to the innovation that is offered by the supply chain

We have achieved our emissions reduction target of 25% by 2015. BAM is recognised as a world leader for corporate action on climate change and is a CDP Climate A-List company. Some alternatives offered via the value chain have been taken up by customers but, we must do more. Our new strategic agenda will be launched in the next few months and includes further, stretching targets.

Commitment 4: Proactively reducing carbon emissions and waste and continually improving the efficiency of our business

We are part of CEMARS and have achieved our reduction targets. Total waste production has significantly reduced and diversion from landfill has been maintained at 80 - 90% for many years. Energy efficiency measure include - fixed premises refurbishments and training and awareness raising for all. Emissions from liquid fuel, electricity and travel have all been reduced and our company car fleet has average emissions of 105g/kM, with plans to reduce further.

Success story: Collaboration on the M3 motorway

Through collaborative working, Balfour Beatty and AECOM have helped to meet Highways England’s targets to realise efficiency savings on the M3 motorway. In regular design review workshops, options to do this are evaluated. An example of which was the replacement of a number of retaining walls with an earthworks solution. This has led to numerous savings in cost and material use including:

- £1.4m cost savings
- 1,615 TCO2e not being released by reduction in material and transport
- 2,473 m² less concrete
- 653 t less steel
- 4,325 t fewer aggregates
- 437,000 l less water

In addition the construction programme was shortened by 49 days and 245 man days were eliminated from people/plant interface exposure.

Success story: Leeds Flood Alleviation Scheme (Leeds FAS)

In agreement with Leeds City Council, the BAM / Mott MacDonald joint venture team replaced existing cast iron railings with the Ferrocast post and rail system. Distributed in the UK by Marshalls, the Ferrocast system is 10% cheaper and has 70% less embodied carbon than more traditional products. Local manufacture also reduced transport emissions by more than 90%. Ferrocast is much lighter and maintenance costs are all but eliminated as this product does not require further painting. The use of more local stone has further reduced costs and embodied carbon (over 20%) on this project.

Commitment 1: Working with the industry to develop a standard method of carbon measurement and working with customers to develop and improve their sector specific tools.

We worked with industry bodies during the consultation for PAS 2080. We have advised some customers of potential improvements to their systems.

Commitment 1: Setting carbon targets and monitoring our carbon intensity

The Group’s total CO2e figure for Scope 1 and 2 emissions has dropped by 9% since 2010. Balfour Beatty’s 2020 goal is to achieve a 50% reduction per £ million turnover of its Scope 1 and 2 emissions (against a 2010 baseline). Whilst the business has only five years to achieve this target, it has recently appointed a dedicated energy team to reduce fuel and energy use which will lead to a reduction in Scope 1 and 2 carbon emissions.

Commitment 3: Obtaining external assurance on our performance

Our 2015 greenhouse gas accounts was independently assured by KPMG, who have done this since 2012. Our performance against the Certified Emissions Measurement and Reduction Scheme (CEMARS) is externally assured within our Gas and Water and Power Transmission and Distribution business Units. We have held this certification for over five years. During this period we have seen a 38.8% reduction in absolute scope 1 & 2 emissions (tCO2e) and a 9% reduction in scope 1,2&3 emissions intensity (GDP adjusted, tCO2e/£m) under the CEMARS scheme. The reductions are based upon a rolling five year average. We are currently implementing ISO 50001 with some of our operations planning to be certified by the end of 2016, before rolling out across all our operations.

Commitment 2: Setting carbon targets and monitoring our carbon intensity

The Group’s total CO2e figure for Scope 1 and 2 emissions has dropped by 9% since 2010. Balfour Beatty’s 2020 goal is to achieve a 50% reduction per £ million turnover of its Scope 1 and 2 emissions (against a 2010 baseline). Whilst the business has only five years to achieve this target, it has recently appointed a dedicated energy team to reduce fuel and energy use which will lead to a reduction in Scope 1 and 2 carbon emissions.

Commitment 2: Providing carbon reduction assessments for alternative offers and solutions

Our “Partnering with our own Supply Chain” policy commits us to taking into account sustainability related issues, alongside other factors, in the way we view suppliers’ services. It also encourages suppliers, where appropriate, to work towards or maintain ISO 14001. These requirements are defined within our business management system, which has been developed to meet the needs of our customers, contracts and our businesses.

Commitment 3: Defining clear low carbon targets and being responsive to the innovation that is offered by the supply chain

We have achieved our emissions reduction target of 25% by 2015. BAM is recognised as a world leader for corporate action on climate change and is a CDP Climate A-List company. Some alternatives offered via the value chain have been taken up by customers but, we must do more. Our new strategic agenda will be launched in the next few months and includes further, stretching targets.

Commitment 4: Proactively reducing carbon emissions and waste and continually improving the efficiency of our business

We are part of CEMARS and have achieved our reduction targets. Total waste production has significantly reduced and diversion from landfill has been maintained at 80 - 90% for many years. Energy efficiency measure include - fixed premises refurbishments and training and awareness raising for all. Emissions from liquid fuel, electricity and travel have all been reduced and our company car fleet has average emissions of 105g/kM, with plans to reduce further.

Success story: Collaboration on the M3 motorway

Through collaborative working, Balfour Beatty and AECOM have helped to meet Highways England’s targets to realise efficiency savings on the M3 motorway. In regular design review workshops, options to do this are evaluated. An example of which was the replacement of a number of retaining walls with an earthworks solution. This has led to numerous savings in cost and material use including:

- £1.4m cost savings
- 1,615 TCO2e not being released by reduction in material and transport
- 2,473 m² less concrete
- 653 t less steel
- 4,325 t fewer aggregates
- 437,000 l less water

In addition the construction programme was shortened by 49 days and 245 man days were eliminated from people/plant interface exposure.
Commitment 1: We commit to nominating a main board member who will have express responsibility to drive the carbon reduction agenda

Our commitment to the drive carbon reduction has been endorsed at the highest level in our business by the Operations Director (Sean Jordan), who was our original signatory to the Infrastructure Carbon Review Statement of Endorsement and continues to be fully engaged in the three pillars of Leadership, Innovation and Procurement. As part of our leadership programme, over 50 managers and staff have been trained to carry out carbon reporting in accordance with Southern Water’s Carbon Standard and a senior manager is tasked with reviewing our innovation opportunities.

Commitment 2: We commit to holding a series of engagement sessions with the leaders of our supply chain to explore how we can collectively drive lower carbon solutions and stimulate innovation

Since becoming a signatory, we have held two Key Supplier conferences presenting on our Supply Chain Strategy for Asset Management Programme 6 (AMP6) featuring our planned supply chain engagement through procurement events and our Supplier Relationship Management tool. Our newly appointed Procurement Manager is working closely within our Procurement Hub, jointly established between BTU and our client, Southern Water as well as working on specific supply chain issues with individual suppliers. As an opportunity to reduce our carbon footprint in relation to inlet screen maintenance projects, we have established a workshop close to our projects in Kent to provide greater control over the refurbishment of screens and to reduce the carbon in transportation.

Commitment 3: We commit to developing carbon reports for all our planned projects and to develop case studies demonstrating effective low carbon management

In the Asset Management Programme 5 (AMP5) under our original Framework Contract up to the Summer 2015, we developed Carbon Reports for each of our planned infrastructure projects in accordance with Southern Water’s Carbon Standard. These projects ranged from the installation of inlet screens, pumping station maintenance and significant upgrades for water treatment facilities. Within the new Asset Management Programme 6 (AMP6), our projects are based on “React & Maintain” requirements to ensure that failing assets can be bought back into service. The opportunities for carbon reduction relate to the repair or replacement of existing assets and the transport fuel usage. Here, our innovative metrics for total fuel usage per 1,000 operational hours & operational hours per operational mile are further reducing our carbon footprint and are reported directly to our client.

Success story: Understanding carbon reduction

Our successes since becoming a signatory have been driven from a greater understanding of the role of carbon reduction by our staff and its application to our previous planned projects. Case Studies are under review with carbon reduction opportunities reported at 5-10%. Going forward, it is going to be about our supply chain engagement and transport reductions that will make a real difference within our Asset Management Programme 6 (AMP6) delivery for the next four years.

Commitment 1: Measure, benchmark and report on carbon emissions and other environmental aspects

British Precast published its annual sustainability report "Sustainability Matters" in May 2015 which reported on the sector’s progress with carbon emissions (and other KPIs) and offered feedback on progress with our 2020 Targets. British Precast is also part of the Sustainable Concrete Forum which published its latest 7th sustainability performance report at Ecobuild 2016.

Commitment 2: Work with our members to reduce their factory carbon emissions by 20% by 2020

In 2014, our members’ factories reported an overall reduction of 9.5% in carbon emissions (baseline year: 2012).

Commitment 3: Work with our members to reduce their factory waste by 10% by 2020

In 2014, our members’ factories exceeded the 2020 target and reported an overall reduction of around 15% to waste generated at factories (baseline year: 2012).

Commitment 4: Work with our members to increase the proportion of low carbon cementitious additions to 25%

In 2014, our members reported an overall low carbon cementitious replacement rate for cement of 16.6%.

Success story: H+H aircrete factory energy consumption improvement

H+H developed a range of policies and procedures to manage energy consumption and developed Environment and Energy Improvement Teams at each aircrete factory to drive change, leading to a 20% reduction in energy usage per m³ of product in 2014 from 2009 levels.

This project was the winner of the BP Sustainability Award 2015.

Success story: Marshalls’ pavement factory compressed air reduction

A programme of compressed air pressure reduction was set up by a Marshalls’ pavement factory leading to £4,000 and 22t CO₂ savings.

This project was a finalist at the BP Sustainability Award 2015.
Infrastructure Carbon Review - Success Stories

The Carbon Trust is an independent, expert partner of leading organisations around the world, helping them contribute to and benefit from a more sustainable future.

- We advise businesses, governments and the public sector on opportunities in a sustainable, low carbon world.
- We measure and certify the environmental footprint of organisations, supply chains and products.
- We develop and deploy low carbon technologies and solutions, from energy efficiency to renewable power.

Commitment 1: To support the measurement and ongoing reduction of carbon emissions from the infrastructure sector and its supply chain, through providing advice, footprinting, and certification services

The Carbon Trust works with several infrastructure and construction companies to certify their reductions in water, waste and carbon. These clients include Highways England, Network Rail, National Grid, Anglian Water and Heathrow Airport. As well as providing these companies with the external certification, verification and validation of their environmental impacts, the Carbon Trust advisory team has provided extensive advice on energy, water, waste and carbon management. An example of this includes the energy management and measurement advice provided for Galliford Try to ensure they are compliant with the ESOS Regulations.

Commitment 2: To support low carbon technology innovation and enable lower carbon emissions in the infrastructure sector and its supply chain

Working with the Carbon Trust, Marshalls was able to use life cycle footprinting to navigate the complexities of whether to choose virgin or recycled inputs for its products. We found that in some cases the use of virgin materials had lower carbon emissions than recycled aggregates, once the energy required to process the outputs of demolition had been taken into consideration. The value of collecting this information has been realised by integrating it into a holistic marketing and communications strategy, allowing buyers to make easy and meaningful like-for-like comparisons between products based on their environmental impact. Similarly, FM Conway used life cycle analysis to support the promotion of its Enviro range of asphalt products. This involves using a proportion of recycled aggregates, with the aim of having a significantly lower carbon footprint than traditional asphalt. Working with the Carbon Trust, a model was developed to assess the carbon footprint of asphalt products containing differing levels of virgin and recycled raw materials. The model guides procurement decisions, providing both a carbon and cost perspective for operations and products. Lafarge Tarmac recognised that one of the most significant areas of environmental impact from asphalt was from the energy used to heat it and led to a three year project with the UK government and the Carbon Trust through the Industrial Energy Efficiency Accelerator programme. The project has lifted market barriers for the use of lower temperature asphalt used in road construction, which reduces energy costs and cuts carbon emissions by up to 35%. If the new specification is adopted and lower temperature asphalt market achieves 21% of the total UK asphalt market over the next decade, it has the potential to save £46.2m and around 250,000 tonnes of CO2, during the manufacturing.

Commitment 3: To widely promote and disseminate best practices in carbon reduction across the infrastructure sector and its supply chain

The Carbon Trust is heavily involved in various events and projects to raise awareness to the best practices required in this sector. In addition to the launch of the Carbon Trust Standard for Supply Chain in September 2015, we will be hosting a Business Breakfast Briefing on the topic in February 2016 to further emphasise its importance. We hosted an event in Leeds with Highways England to discuss their journey measuring, managing and reducing their resource consumption with the Carbon Trust. This event attracted a wide range of infrastructure specialists. Aside from hosting events, the Carbon Trust has published several viewpoints to provide free advice and insight into embedding sustainability and innovation in the sector. Such publications, available on our website, include ‘Building a lower-carbon construction industry’ and ‘Communicating the power of sustainability’. Our contributions extend beyond our company as we provided peer review services in the development of PAS 2080.

Success story: Carbon hotspot identification tool

Willmott Dixon has partnered with the Carbon Trust to develop an innovative, cost-effective and efficient tool to help businesses identify carbon hotspots along their supply chain. This tool allows companies to develop a long-term strategy and vision model for supplier engagement. By being able to do this, businesses can identify high carbon activities and develop targets that translate into cost and carbon benefits for parties involved.
For the second successive year we have seen a reduction in carbon emissions. Our carbon emissions by a UKAS accredited certification body. For the previous financial year (2014/15), we have been actively working to reduce them for the last 6 years. Each year we go through external verification of the KPIs and critical success factors set by the board at an operational level, most notably a 25% reduction in carbon emissions to 2020 from a 2015 baseline.

Success story: UKAS carbon accreditation

The Clancy Group has been aware of the significance of reducing its carbon emissions for a while and has already begun to introduce measures. We have seen great success communicating with our suppliers and asking them to commit to the Clancy Group carbon reduction ambitions at tender stage to enable delivery of any joint ambitions.

Commitment 1: Leadership - To create the environment and the imperative for change

The Clancy Group have taken the opportunity to restructure its sustainability leadership during the introduction of a new five year business plan. The appointment of a director and two associate directors will provide strategic and operational leadership on sustainability and carbon performance at the highest level. The Group have appointed a Sustainability Manager who is responsible for delivering carbon performance and reduction, as well as delivering the KPIs and critical success factors set by the board at an operational level, most notably a 25% reduction in carbon emissions to 2020 from a 2015 baseline.

Commitment 2: Innovation - To be the engine of change

Traditional approaches to reducing carbon emissions have seen moderate success within The Clancy Group. As the majority of emissions are fleet and vehicle based, the emphasis has been around vehicle procurement. However, the Group has taken the innovative step to addressing driver behaviour by introducing an Occupational Road Risk team to monitor driving habitats (through the use of technology) such as driving styles, speed, journeys, idling and refueling. By addressing these elements (along with procurement options), The Group believes it could further reduce its emissions which would represent a significant cost saving and a relatively short return on investment for introducing the team.

Commitment 3: Procurement - To provide the mechanisms that enable the supply chain to respond

The Clancy Group recognises the significant impact its value chain has on carbon emissions and, understanding its responsibilities, has already begun to introduce measures. We have seen great success communicating with our suppliers and asking them to commit to the statement of endorsement for the Infrastructure Carbon Review (20% have responded). Discussions on carbon emissions, and how to reduce them, are held in regular forums with our value chain. A wider programme of sustainability engagement with all stakeholders is being developed and will encompass procedures to ask suppliers of their own carbon reduction ambitions at tender stage to enable delivery of any joint ambitions.

Success story: Collaboration on the Heysham M6 road project

On our Heysham M6 road project we collaborated with Tarmac to reduce embodied carbon and cost. We agreed to include a 20% reduction KPI within the contract associated with delivery of their work package. By working closely with Tarmac’s design teams early on in the design and delivery process they were able to deliver a reduction in embodied carbon greater than 20% and significant savings in virgin material usage and cost.

Commitment 4: We commit to defining clear low carbon targets and being responsive to the innovation that is offered by the supply chain

An internal working group was formed in 2015 with the express focus of developing a system for quantifying embodied carbon at estimating phase and designing a framework for introducing an internal price of carbon. The work of this group has involved meetings with many of our key design partners and material suppliers. Both of the required outputs are nearing completion and will help drive innovation across our value chain as we will easily be able to identify project “hotspots” at various points throughout design and delivery phases and target specific clusters of suppliers to collaborate with to reduce carbon impacts on a project by project basis.

Commitment 5: We commit to nominating a main board member who will have express responsibility to drive the carbon reduction agenda

Andrew Wylle, Costain’s chief executive, has responsibility for driving carbon reduction, and broader climate change agendas.
Infrastructure Carbon Review - Success Stories

Crossrail will provide substantial improvements to public transport capacity in and around London. Crossrail will support efforts to reduce the contribution of transport to climate change, with efficiencies arising from higher use of public transport. As such, it is vital that the design and construction of Crossrail seeks opportunities to achieve these reductions.

Commitment 1: Commit to minimise the carbon footprint of the programme through the construction phase
We have developed and are constantly improving our construction carbon emissions predictor tool. This allows for baseline emissions to be calculated at the start of the project and interventions to be modelled in order to ascertain their impact on the construction footprint. For material movements, rail and waterborne transport were prioritised, particularly for excavated materials being removed from site. Current forecasts indicate a 13% reduction against the baseline.

Commitment 2: Commit to achieving energy saving efficiencies through design of station facilities and best practice in operation
Our specification for lifts and escalators has ensured that low energy equipment has been procured and as part of a TfL wide procurement. The legacy of this procurement is that during the wider TfL escalator and lift replacement programme, these benefits will be magnified. In addition to energy efficiency improvements are about 20%. We have now committed to a 100% LED lighting solution both front and back of house in stations and within running tunnels and shafts having overcome challenges with regard to reliability and maintenance in the operational rail environment. We continue to work with our design teams to ensure efficient cooling and ventilation systems will be designed, procured and installed. A comprehensive station building user guide will be provided to the operator and maintainer in addition to the more technical operational and maintenance manuals typically made available at handover.

Commitment 3: Commit to working with our supply chain to procure materials and products for Crossrail that take due account of their sustainability and impact on the project’s carbon footprint
All our contractors have been required to produce a carbon and energy management plan. Plans are reviewed quarterly and updated to reflect new opportunities. We chair a Crossrail Carbon Working Group with membership from our tier 1 contractors to share good practice. The working group also invites supply chain members to present on what they are doing within the industry to reduce energy usage and carbon. Examples include concrete manufacturers and suppliers and plant hire companies. Low carbon options are procured where economically viable. We are also working with low carbon innovators such as the David Ball Group and Nustone Ltd to help develop industry confidence in the use of such products.

Commitment 4: Managing our fleet and encouraging sustainable travel options
We have committed to achieving a fleet average of 80g/km CO2 for our car fleet by 2020. We are also committed to continuing with our travel hierarchy that is effective in influencing our culture and behaviour around choosing if, when and how to travel.

Commitment 5: Working with suppliers
We have committed to working with our top 100 suppliers to reduce the sustainability impacts of our supply chain. Over 70% of our CO2 emissions can be attributed to our suppliers and we are taking steps to influence this. We have a well established track record of measuring carbon and using the environmental scorecard with our framework suppliers. We are now extending this to include our minor works frameworks. We have committed to sharing our tools and experience with our partners and industry eg on the Gov.UK website.

Success story: low carbon pumping strategy
Since 2006/07 we have saved just over 9000 tonnes CO2 and approximately £150k for our pumping activities which account for around a third of our CO2 emissions. We developed a software tool for detecting carbon hotspots in a pumping station and then looked in detail at the areas that the tool highlighted. We adopted a variety of solutions from changing pumping regimes, renewing conventional motors for energy efficient motors, adopting variable speed control and modifying station pipe work.

Commitment 1: Launch of National Integrated Environmental Management (IEM) 2020 plan
We have a new 2020 IEM plan that we are launching in Spring 2016. It includes targets for managing our direct CO2 emissions associated with our work as well as other footprints like waste and water. We have established a leadership team to steer the development of a number of sustainable objectives looking at for example renewables, natural capital and our business planning process.

Commitment 2: Reducing whole life carbon for all construction, operation and maintenance activities
In Flood & Coastal Risk Management we have committed to a new target for reducing our CO2 emissions for all our construction, operation and maintenance activities. For operation and maintenance activities we have a new target of 45% reduction in CO2 emissions by 2020 against a baseline of 2006/07. For construction of new schemes we have a target of a 40% reduction in CO2 emissions from OGC Gateway 1 (outline business case) to OGC Gateway 4 (construction completion).

Commitment 3: New carbon tools
We have developed new carbon management tools, including a whole life carbon planning tool that allows us to make informed choices at optioneering stage for new schemes. Considering carbon will now become part of our business planning approval process. We have rolled out training across our organisation and to our suppliers. We are also committed to setting carbon as an attribute of our new Building Information Modelling (BIM) work for our capital programme.

Commitment 4: Managing our fleet and encouraging sustainable travel options
We have committed to achieving a fleet average of 80g/km CO2 for our car fleet by 2020. We are also committed to continuing with our travel hierarchy that is effective in influencing our culture and behaviour around choosing if, when and how to travel.

Commitment 5: Working with suppliers
We have committed to working with our top 100 suppliers to reduce the sustainability impacts of our supply chain. Over 70% of our CO2 emissions can be attributed to our suppliers and we are taking steps to influence this. We have a well established track record of measuring carbon and using the environmental scorecard with our framework suppliers. We are now extending this to include our minor works frameworks. We have committed to sharing our tools and experience with our partners and industry eg on the Gov.UK website.

Success story: low carbon pumping strategy
Since 2006/07 we have saved just over 9000 tonnes CO2 and approximately £150k for our pumping activities which account for around a third of our CO2 emissions. We developed a software tool for detecting carbon hotspots in a pumping station and then looked in detail at the areas that the tool highlighted. We adopted a variety of solutions from changing pumping regimes, renewing conventional motors for energy efficient motors, adopting variable speed control and modifying station pipe work.

Success story: LED lighting in Crossrail stations
The decision to move from conventional to LED lighting in stations will result in a significant whole life cost and carbon savings.

Crossrail will provide substantial improvements to public transport capacity in and around London. Crossrail will support efforts to reduce the contribution of transport to climate change, with efficiencies arising from higher use of public transport. As such, it is vital that the design and construction of Crossrail seeks opportunities to achieve these reductions.

Commitment 1: Commit to minimise the carbon footprint of the programme through the construction phase
We have developed and are constantly improving our construction carbon emissions predictor tool. This allows for baseline emissions to be calculated at the start of the project and interventions to be modelled in order to ascertain their impact on the construction footprint. For material movements, rail and waterborne transport were prioritised, particularly for excavated materials being removed from site. Current forecasts indicate a 13% reduction against the baseline.

Commitment 2: Commit to achieving energy saving efficiencies through design of station facilities and best practice in operation
Our specification for lifts and escalators has ensured that low energy equipment has been procured and as part of a TfL wide procurement. The legacy of this procurement is that during the wider TfL escalator and lift replacement programme, these benefits will be magnified. In addition to energy efficiency improvements are about 20%. We have now committed to a 100% LED lighting solution both front and back of house in stations and within running tunnels and shafts having overcome challenges with regard to reliability and maintenance in the operational rail environment. We continue to work with our design teams to ensure efficient cooling and ventilation systems will be designed, procured and installed. A comprehensive station building user guide will be provided to the operator and maintainer in addition to the more technical operational and maintenance manuals typically made available at handover.

Commitment 3: Commit to working with our supply chain to procure materials and products for Crossrail that take due account of their sustainability and impact on the project’s carbon footprint
All our contractors have been required to produce a carbon and energy management plan. Plans are reviewed quarterly and updated to reflect new opportunities. We chair a Crossrail Carbon Working Group with membership from our tier 1 contractors to share good practice. The working group also invites supply chain members to present on what they are doing within the industry to reduce energy usage and carbon. Examples include concrete manufacturers and suppliers and plant hire companies. Low carbon options are procured where economically viable. We are also working with low carbon innovators such as the David Ball Group and Nustone Ltd to help develop industry confidence in the use of such products.

Commitment 4: Managing our fleet and encouraging sustainable travel options
We have committed to achieving a fleet average of 80g/km CO2 for our car fleet by 2020. We are also committed to continuing with our travel hierarchy that is effective in influencing our culture and behaviour around choosing if, when and how to travel.

Commitment 5: Working with suppliers
We have committed to working with our top 100 suppliers to reduce the sustainability impacts of our supply chain. Over 70% of our CO2 emissions can be attributed to our suppliers and we are taking steps to influence this. We have a well established track record of measuring carbon and using the environmental scorecard with our framework suppliers. We are now extending this to include our minor works frameworks. We have committed to sharing our tools and experience with our partners and industry eg on the Gov.UK website.

Success story: low carbon pumping strategy
Since 2006/07 we have saved just over 9000 tonnes CO2 and approximately £150k for our pumping activities which account for around a third of our CO2 emissions. We developed a software tool for detecting carbon hotspots in a pumping station and then looked in detail at the areas that the tool highlighted. We adopted a variety of solutions from changing pumping regimes, renewing conventional motors for energy efficient motors, adopting variable speed control and modifying station pipe work.
Commitment 1: We commit to using the carbon maturity matrix to identify areas for development and to implement an action plan for driving that improvement

We are committed to evidence-based decision making and therefore have agreed carbon performance measures that have been rolled out across the business. Our performance monitoring methodology is in line with the ENCORD Protocol and Global Reporting Initiative and we have benchmarked our performance against our peers. Our latest published performance (2014) shows a 29% reduction in Scope 1 and 2 emissions from the 2013 data. Carbon data is reported quarterly at Business Unit (BU) level and carbon minimisation plans have been developed by each BU.

Commitment 2: We commit to defining clear low carbon targets and being responsive to the innovation that is offered by the supply chain

We have developed organisational and business unit carbon targets and report on progress on a quarterly basis. We recognise that supply chain engagement is vital if we are to minimise the carbon emissions from our own activities and from the built assets we deliver. As such we have partnered with the Supply Chain Sustainability School to roll out training and awareness raising to our supply chain partners on a range of issues including carbon reduction. Furthermore, our new ‘Advantage through Alignment’ strategy will enable us to better collaborate with supply chain partners and unlock opportunities for innovation and carbon reduction.

Commitment 3: We commit to building carbon reduction into our procurement requirements

We have brokered arrangements with our pump and generator suppliers to receive their most efficient equipment by default. This has helped to manage emissions on site and we have seen a relative reduction in the consumption of red diesel of circa 10% while our business continues to grow. We have undertaken a project to further reduce fuel oil consumption (which provides the greatest carbon impact from our on site activities) by working with our major suppliers.

Commitment 4: We commit to training and upskilling our staff

In order to ensure that our own people have the knowledge and understanding to deliver successful carbon reduction on our projects, we are rolling out the Site Environmental Awareness Training Scheme, as developed by Build UK and CITB. In the last 12 months 84 employees completed a four-day IOSH Managing Environmental Responsibilities and 576 employees completed internal training on other environmental aspects.

Commitment 5: Car fleet and efficient cabins

We recognise the carbon impact of other resource efficiency priorities, including site waste, vehicle movements and water use. As such, we have targeted improved performance in each of these areas. For instance:

- We have improved our waste management processes so that now 92% of construction and demolition waste is diverted from landfill
- An organisational Travel Plan is currently under review
- We have incentivised staff to select more energy efficient company cars
- We are working with suppliers to ensure that low impact plant is selected.
- Energy efficient site cabins are now selected as standard

Success story: Supply chain relationship success

As stated above, our latest published carbon results for the calendar year 2014 show a significant reduction in our emissions (normalised for £100k revenue). The greatest improvement has been seen in non-fleet fuel. This has been achieved through developing better relationships with our supply chain partners and identifying low impact plant.

Success story: Carbon reduction through electricity metering

Our Energy Demand Management programme reduces emissions from our fixed infrastructure through effective metering, energy efficiency projects and investment in low carbon energy supply. In 2014, Heathrow saved £10m through improving metering. It helped us generate more accurate bills to third parties, generating £22m in income in 2014. In 2015, we cut electricity use by 27GWh, adding to the 19% carbon reduction we’ve achieved towards our 2020 target.
Commitment 1: Effective leadership
With a key responsibility in delivering the Government’s carbon reduction strategy for transport Highways England will work closely with our suppliers to help reduce our carbon footprint and reduce emissions from network-related activity. Highways England is leading the way with its commitment to the environment after becoming the first government body to be awarded the prestigious Carbon Trust Triple Accreditation for Carbon, Waste and Water.

Commitment 2: Culture and communication
Highways England communicates a vision for sustainability, including carbon reduction goals. Carbon management is a priority corporate vision in Highways England’s first sustainable development strategy; this priority focuses efforts on reducing supply chain and end-user carbon as well as direct organisational impacts. Carbon reduction is recognised in numerous aspects as a core value which influences decision making from major road scheme appraisal to office facilities investments.

Commitment 3: Metrics and governance
We will need to demonstrate we are playing our part in reducing greenhouse gas emissions in line with current and future national targets. Two carbon performance indicators have been developed. A measure will focus on reducing our corporate Scope 1 and Scope 2 from offices, control centres, the network and Highways England vehicles and the business travel element of Scope 3 as defined by the Greenhouse Gas Protocol. The second indicator focuses on our asset carbon footprint covering the supply chain construction and maintenance activities (energy use, materials, transportation and waste) within Scope 3; this indicator also reports carbon intensity.

Commitment 4: Innovation and standards
A new carbon tool has been rolled out to our supply chain split into ten categories largely based upon the Specification for Highways Work. To encourage, recognise and reward the innovation that suppliers can input, a more accurate carbon factor compared to the national or default carbon intensity factors for materials is used throughout the tool. This also supports our asset carbon performance indicator covering the supply chain construction and maintenance activities.

Commitment 5: Commercial solutions
Contributing to our low footprint ambition is an explicit requirement of our major consultant and contractor delivery framework. And within our collaborative performance framework a sustainability metric mirrors the asset carbon performance indicator covering the supply chain construction and maintenance activities.

Success story: Investment in new fleet fuel sources
At H.E.Group we have continued to invest in solar power, dual fuel, CNG powered vehicles and electric powered Tesla S cars along with our investment in updating our plant hire fleet enabling us to supply the most modern and environmentally friendly hire fleet in the UK. This has enabled us to improve our continued commitment to reduce our overall carbon footprint within the group.

Success story: Investment in new fleet fuel sources
The UK’s largest specialist excavator hire company, H.E.SERVICES has the largest, most modern and efficient hire fleet in the country. By continued investment in renewable energy, electric, CNG and dual fuel vehicles is helping us to achieve our overall goal of reducing our carbon footprint and operating costs.
Commitment 1: We commit to holding a high-level event with the leaders of our supply chain to explore how we can collectively drive lower carbon solutions and stimulate innovation.

We have held supply chain conferences in Birmingham in 2013 and in London and Manchester in 2014. In 2015 we held further roadshows in Wales, Northern Ireland and Scotland. In addition to this, we have held a number of Market Soundings to get input to procurement plans and other functional strategies. The events are an important part in creating an informed supply chain that understands HS2 Ltd’s values and requirements and that can effectively plan for, compete and deliver work packages. We are currently developing our Innovation Strategy.

Commitment 2: We commit to making carbon minimisation a requirement of the HS2 project and our procurement requirement.

We have adopted a Carbon Minimisation Policy. Compliance with the policy is a project requirement. The policy sets out our approach to minimising carbon emissions associated with the construction and operation of the scheme:
- Calculate the carbon footprint and use this as a tool to assess the potential to reduce carbon across the design, construction and operation phases.
- Consider low-carbon options in developing the detailed design.
- Reduce embedded carbon in construction materials and carbon emissions from construction works.
- Reduce the scheme’s energy requirements and maximise the energy efficiency of operations.
- Use and/or generate low-carbon energy and
- Sequester carbon.

Additionally, we are updating the draft Code of Construction Practice, which sets out a series of measures and standards to be applied throughout the construction period, to include construction carbon management requirements.

Commitment 3: We commit to calculating the carbon footprint of the scheme, using this as a tool to assess the potential to minimise carbon across the project design, construction and operation, and re-calculating the carbon footprint at appropriate intervals to determine progress.

The Phase One Environmental Statement (2013) reported the carbon footprint of Phase One and presented an assessment of the greenhouse gas (GHG) emissions associated with its construction and operation. A number of design changes have since been made to the scheme and a number of amendments to the scheme are also being proposed. Accordingly the Phase One carbon footprint has been updated and reported in subsequent Environmental Statements, which can be accessed at https://www.gov.uk/government/collections/high-speed-rail-london-west-midlands-bill. An Environmental Statement for the route between the West Midlands and Crewe will include a GHG assessment. We are currently reviewing and updating the scope and methodology for the GHG assessment.

Success story: Low carbon leadership

The ICE has over the past years conducted a number of studies into carbon reduction and climate change. In particular our Low Carbon Lifed Panel produced some strong guidance on how to reduce carbon in infrastructure projects. ICE has been successful in bidding for the Chairmanship of the World Federation of Engineering Organisations’s committee on engineering and the environment through which we presented a declaration at COP21 on how engineers can contribute to tackling climate change.
Commitment 1: Measure Operational Carbon - measure all operational fuels at a company level and link to turnover

Operational carbon (fuel and energy consumption) is recorded and published each year in our Annual Review, including links to turnover. These reports are also included in our quarterly performance summaries, which are produced for the whole company and for each operating region. We are also establishing initiatives to reduce business mileage including holding on-line meetings via Lync, developing office-specific Green Travel Plans and car sharing initiatives.

Commitment 2: Measure Capital Carbon - Measure capital carbon from principal materials at both company and framework levels, linked to turnover

Figures will be measured on a rolling 12-month basis and will be recorded quarterly. We have developed an automatic report that can easily be run to collate the quantities of principal materials delivered to our sites, at company and framework level, to help us to measure capital carbon. This is used for aggregates, in-situ concrete, reinforcement and pre-cast products, both designed (e.g. pre-cast reservoirs) and non-designed (e.g. manholes). This is then used to calculate carbon emissions from these products against operational turnover.

Commitment 3: Case Studies - Write 2 case studies by the end of 2014 to demonstrate and communicate carbon reduction on 2 recent projects

Two case studies, Covenham to Boston pipeline and Sutton WwTW, were written by the end of 2014 to communicate carbon reduction initiatives from these projects across the business. Further case studies from 2015 are currently being developed.

Commitment 4: Policy Statement - Update the company Environmental Policy Statement to include measuring carbon from principal materials

The 2015 updated Environmental Policy Statement includes monitoring and reporting energy use and CO2e arising from our operations, as well as specific sections on fuel and energy consumption. In addition, the Statement states that we will investigate methods by which journey times and distances can be reduced and efficiency improved as we see reducing business travel as a key factor in reducing our CO2 emissions.

Success story: Hybrid excavator fleet

Around the time of issue of ICR we purchased our first hybrid excavator, the first company in the North of England to purchase one of these machines. We have since expanded our fleet and now own eight hybrid excavators. The energy recovery from these saves approximately 30% like-for-like fuel usage. As a result of our increasing plant efficiency our total carbon emissions due to gas-oil usage has reduced, from 43.80T CO2e/£M turnover in 2013 to 33.53T CO2e/£M in 2014 and 30.85T CO2e/£M in 2015.

Commitment 1: Making carbon reduction a requirement on all our major projects and programmes by 2016

In addition to measuring carbon at business unit level, we are now faced with the challenge of measuring and reducing carbon at project scale. To achieve this we are developing best-in-class systems that support carbon optioneering such as our BIMXtra software - now initiated at the design and tender stage on all major projects. Kier’s in-house software includes a module for carbon calculation, enabling reconciliation of carbon for different projects during optioneering. We also develop bespoke action plans that ensure delivery of carbon commitments throughout the life of a project. These provide a trackable thread which is linked into our performance dashboards to provide monthly reports of resource usage, linking carbon to cost.

Success story: Hinkley Point C earthmoving

At Hinkley Point C, Kier has used their mining expertise to select efficient, large earthmoving plant to undertake works which will reduce fuel usage by an estimated 1.7 million litres and reduce carbon emissions by approx. 5000tCO2e over the duration earthworks’ contract.

Commitment 2: Nominating a main board executive director to have express responsibility to drive the carbon reduction agenda

Kier launched its Strategy for Sustainable business in 2015. It is aligned to our five-year strategy for growth, Vision 2020, and addresses the challenges we may face. Carbon is an integral component within this strategy and its effective management is vital to support our growth. Sean Jeffery (Executive Director for Infrastructure and Utilities) recognises the importance and benefits of working towards a low-carbon economy and has assumed leadership for the carbon agenda. He is passionate about driving efficiency and sees carbon as a key tool for stimulating LEAN, innovative thinking to achieve optimum value solutions for Kier’s clients.

Commitment 3: Using the carbon maturity matrix to identify areas for development and to implement an action plan for driving that improvement and commit to moving up a minimum of one level in each area by 2016

We view carbon as a catalyst for business transformation to support its strategy for growth and provide business resiliency to our operating companies, clients and supply-chain. Using the Carbon Maturity Matrix, we are able to define our carbon vision to provide us with a framework to measure and improve. We have created a road map which outlines how Kier will achieve our vision, informing our decisions on the investment and creation of tools and systems required to support the measurement and optimisation of carbon at project level. Through our certification to BS 11000, we have secured collaborative relationships with several clients, delivery partners and suppliers which are driving mutual efficiency and carbon reduction advancements.

“Kier’s successful pursuit of BS 11000 enhanced relationships with our supply chain and clients is facilitating earlier engagement in projects. The benefits of collaboration are showing through. Whilst it is early days we are seeing evidence of a direct correlation between carbon reduction and cost reduction”.

Sean Jeffery Executive Director for Kier Infrastructure and Utilities
Laing O’Rourke is an engineering enterprise providing contracting services to infrastructure clients, and we see tackling carbon as key to efficient construction and making infrastructure fit for the future - in the interests of our clients, our people, our supply chain, our communities, and for the sustainable success of our business.

Commitment 1: Low-carbon innovation embedded in strategy, accelerated by targets
We have set a new target of 50% reduction in direct carbon emissions by 2020 from our 2009 baseline, up from our previous 30% target. We are pursuing reductions vigorously in direct carbon emissions through our Design for Manufacture and Assembly (DfMA) strategy and improvements in efficiency of plant, equipment, site accommodation and vehicles. We have also committed to produce independently-verified carbon footprints for our main off-site manufactured pre-cast products by 2020, and are developing an automated calculation methodology to achieve this. These commitments were our Green Building Council Climate Pledges, linked to COP21.

Commitment 2: Realising lower-carbon solutions with our clients
We continue to innovate to design lower carbon products through off-site manufacturing and are able, for example, to produce structural concrete products with less reinforcing steel through the greater precision we can achieve in a factory environment compared to in-situ. Progressive clients are requiring us to ensure that alternative products result in lower carbon as well as other benefits. This is prompting us to integrate measurement of embodied carbon into digital engineering and estimating processes, so that in the future embodied carbon can be assessed iteratively in the design development process.

Commitment 3: Addressing the concrete carbon challenge with our supply chain
We are hosting workshops on reducing carbon in partnership with the supply chain sustainability school. We are challenging and supporting our supply chain to measure and reduce the embodied carbon of their products, and this is reaping dividends on projects with ambitious carbon reduction targets. We are engaged in research and development work with an industry partner to produce ultra-low carbon concrete which can be used for structural purposes, and have had initial conversations with several clients and key concrete suppliers about its possible use.

Commitment 4: Board level member as carbon champion
We continue to champion carbon reduction from the most senior levels of the business. Peter Williams, Technical Director, is now champion for Carbon at Board Level, with the support of all Board members.

Commitment 5: Direction through the carbon maturity matrix
We are engaging in industry collaborations to help to standardise and improve industry approaches to carbon. In addition to the initiatives described above, we are partners to the Innovate UK ‘Building Whole Life Performance’ collaboration led by Sturgis Consulting and the ‘Design for Performance UK Commitment Agreement Protocol’ which is aiming to replicate the success of Australia’s NABERS scheme in improving building energy efficiency. While both of these initiatives are primarily focused on buildings, they and the organizational networks resulting from them could yield future benefits for reducing carbon in infrastructure.

Success story: Design for Manufacture and Assembly
Through our DfMA approach, and improvements in the efficiency of our vehicle fleet, plant, and site accommodation, we have achieved a 23% reduction in carbon intensity of our activities between 2009 and 2015, with a 5% reduction from 2013-14 to 2014-15.

Commitment 1: We will provide leadership in influencing our customers and partners to reduce carbon by measuring and driving for reductions and by championing lean solutions, including BIM and off-site construction, to minimise carbon emissions, resource use and waste on our projects
Carbon Crunch: In 2015 we held our third annual Carbon Crunch event, working in support of the Green Construction Board with BSI to preview the specification for infrastructure carbon management, PAS 2080, of which we are the lead author. 100 senior influencers and decision makers attended. We sponsored articles explaining PAS 2080 in key industry publications NCE and Construction News and contributed commentary on the carbon agenda throughout the year to Infrastructure Intelligence. Carbon reduction also featured at our major events on climate change, climate resilience and sustainability in January, June and October, reaching an additional 500+ leaders.

Carbon Portal: From 2016, capital projects over £10m and programmes over £100m will be assessed using our new tool, the Carbon Portal. Carbon Portal draws on one of the infrastructure industry’s biggest carbon databases, providing carbon values for a comprehensive range of objects, materials and products in the water, highways, railways and buildings sectors to start with, and more sectors over time. It is uniquely BIM-compatible, enabling designers to see the carbon and cost impacts of engineering decisions from optioneering to capital delivery. We now use BIM as standard for all major projects, contributing to engineering designs that are more cost and carbon efficient across the asset lifecycle. We are increasingly using BIM to design for manufacture and assembly and are working on two of the UK’s exemplar DfMA projects, which will show the cost and carbon benefits of this approach to delivery.

Mott MacDonald is a 16,000-strong consultancy, creating social and economic infrastructure to meet people’s needs in 180 countries, with offices in 50. We seek the optimum outcomes, maximising value and minimising risks, on every project and see carbon reduction - and by extension cost savings - as part and parcel of that.

Success story: Thames Tideway project
On the Thames Tideway Chambers Wharf shaft Mott MacDonald with Costain-Vinci-Bachy joint venture improved the geometry and tolerances to reduce the diameter from 25m to 24.83m, saving 460m² of excavation and in-situ concrete, equating to between 471t and 1113t of CO₂. This gain is replicable on all similar shafts.
Commitment 1: We commit to nominating a main board member who will have express responsibility to drive the carbon reduction agenda

Paul Gedhill (District Managing Director with responsibility for SHEO) MWH Treatment and Ian Davies (Design Director) MWH UK are our nominated sponsors. We have also set up a Joint Sustainability Board to set direction, to ensure an integrated approach across our organisation, and to regularly review progress.

Commitment 2: We commit to making carbon reduction a requirement on our major projects and programmes by end of 2016

MWH Treatment is engaged on a number of major capital programmes for UK water companies including Anglian Water’s @One Alliance, Thames Water’s eight,O, United Utilities’ Advance and Scottish Water’s ESD. In each case MWH Treatment is supporting a carbon reduction initiative. We are working on sharing our experience from the programmes with the more advanced carbon management initiatives to help develop our similar capabilities on the other programmes.

Commitment 3: We commit to holding a high-level event with the leaders of our supply chain to drive lower carbon solutions

We are currently planning this event, focused on collaborative and innovative approaches to the supply of goods and services, which we anticipate will take place later in 2016.

Commitment 4: We will apply the ICR’s carbon maturity matrix to develop and implement a new Business Improvement Priority

We have applied the maturity matrix, which has helped to establish our current position. The UK leadership has since published its 2016 Plan, in which carbon is one of the ten key priorities for improvement. Actions include the need for wider communication across the organisation, to refresh our sustainable design policy and carbon management guidance, to deliver more training and support for technical teams, to review governance to promote low carbon-decision making, to ensure carbon management is included in our Technical Maturity Assessments, and to promote best practice case studies.

Commitment 5: We will hold events with three key clients to explore low carbon approaches for greater efficiency and performance

We are currently planning these events, which we expect to hold with senior representatives of some of our major water company clients. We are scheduling these events to take place later in 2016.

Success story: Thames Water AMP6 capital works programme

MWH Treatment and MWH UK are working, in close collaboration with other industry partners, to deliver Thames Water’s capital investment programme for AMP6, through the eight,O alliance. To help achieve efficiency targets, we worked to confirm the carbon baseline, agree a clear target, and set up processes and tools, which have now been rolled out to delivery teams. Teams are being challenged through the governance process to reduce carbon to save money and deliver more sustainable solutions.

Success story: Carbon at the heart of procurement

A recent tender for an electricity substation in Wimbledon resulted in projected lifecycle carbon savings of over 20% against the original design, demonstrating the benefit for ourselves as the client (carbon savings and cost savings) and the supplier (a successful bid). Savings were made by reducing volumes of insulating gas, utilising low carbon concrete, sourcing re-cycled steel and designing out civil requirements. The carbon savings were 20% against the original design (39,000 tonnes) and the cost savings were 3% (£3m).
Commitment 1: We will make carbon reduction a requirement on all major infrastructure projects on which we work

We continue to focus upon carbon reduction into the design, construction, and maintenance of the Infrastructure projects we work on. Our expertise includes 100 in-house designers, BREEAM services for all sectors, qualified low carbon consultants, delivery of zero and low carbon technologies, expertise in building physics modelling and simulation, key skills in design for manufacture and utilising Building Information Modelling (BIM) techniques. Over the last twelve months we have invested in procurement system improvements to reduce the risk of overpurchasing and the waste this creates and continued to deploy offsite solutions to major Infrastructure projects such as Birmingham New Street.

Commitment 2: We will reduce our direct CO₂ emissions (Scope 1 and 2) by 20% per employee from a 2012 baseline

We have made numerous improvements to our own operations to reduce emissions in 2015. This includes energy efficiency improvements in our own buildings and the completion of a ground-mounted 129 kWp PV system which will generate 127,000 kWh of renewable electricity each year cutting estate emissions by 10% in the last year. Following success in attaining Van Excellence and Gold status from the Transport for London Fleet Operator Service our total transport emissions have reduced by 12% in the past year. Overall we reduced emissions per employee from 2.9 tonnes of CO₂e to 2.7t.

Commitment 3: We will work collaboratively with our supply chain to reduce CO₂ emissions

To date we have developed a responsible procurement charter which establishes sustainability as a core requirement. We have reviewed our Competency Matrix to ensure we identify the necessary skills, knowledge levels and qualifications required to support sustainable procurement requirements. Integration of sustainability into our procurement processes has ensured that supplier selection involves appropriate sustainability assessment within different categories of spend and that adequate weighting is given to carbon. Action Sustainability independently reviewed our initial progress and Level One achievement. We now aim to attain Level 3 by the end of 2016 and achieve Flexible Framework Level 5 by 2018.

Success story: Birmingham New Street Station

We completed our role in the £750m Birmingham New Street station redevelopment. Working alongside Network Rail and Mace, we installed a combined heat and power system (CHP), with over 1km of pipes to recycle the waste heat from the station and circulate it to new buildings on site, such as the new John Lewis store. Our engineers were involved from the outset in creating a heating system that will connect the northern and southern quarters of Birmingham city centre.

Commitment 1: Effective leadership

We have appointed a Director to drive this initiative, who in turn has developed an Employee Forum to discuss and develop carbon reduction businesses initiatives.

Commitment 2: Benchmarking our performance

The Carbon Reduction Forum are working together to identify all carbon sources used by the Business in 2015 and, then to determine the benchmark to be used for 2016 (i.e. a specific quantity or an actual measurable cost to the Business).

Commitment 3: Training our employees

The Employee Induction Training Programme is still being developed to incorporate carbon reduction initiatives. While the general principles of carbon reduction have been included within the Company Induction Training Presentation, the delay is obtaining the actual quantities and costs incurred throughout 2015, so these can be used and, thus present a clearer picture and business objective.

PBU (UK) Ltd operates within the UK utilities industry with the largest fleet of specialist directional drills in Europe. Global Carbon Reduction initiatives are being developed by more than 62 countries. By understanding the global objectives, the long term benefits for our planet and the future generations health and wellbeing, we as a company believe we should look to make our contributions now (no matter how small they may appear) and assist with working towards these global initiatives.
As one of the world’s largest developers and contractors, Skanska is well aware of the environmental challenge facing the construction industry and reducing the environmental impact of the built environment is a core value. Climate change is one of the biggest challenges facing global development and Skanska are determined to be part of the solution. We have set challenging targets, implement proactive policies and continue to innovate, sharing best practice as we go.

Commitment 1: Investing in greening our own facilities and operations
Following on from green investments at our Woking and Maple Cross offices, Skanska completed a £1.4 million redevelopment of our main plant yard. The project was our first to hit our aspirational Deep Green targets which includes zero carbon in operation. Since the start of our office and facility investment programme we have saved 22% on CO2 emissions and 15% in energy consumption. Skanska AB measures energy across over 40 facilities worldwide and last year we supported the development of the World Business Council for Sustainable Development Energy Efficiency Toolkit for Buildings. Across our operations we completed the implementation of the second phase of our green car policy across our Employee Car Ownership scheme, expanded vehicle tracking technology which aids planning and driver behaviour, implemented trials of smart metering on construction sites and implemented a green travel plan to our head office.

Commitment 2: Unlocking Investment for Green Solutions
Through the Skanska Green Fund we continue to build a portfolio of carbon saving projects. The green fund has enabled the trial of 10 electric cars in our staff fleet, the development of an eco-car which is now in test and the installation of Photovoltaics at our offices. We have also invested in smart meters during the construction phase to drive energy awareness and efficiency. We have taken the impetus from the green fund forward to our projects and key clients, installing energy efficiency measures and photovoltaics at one of our highways maintenance depots, a model we are working to expand. We continue to build our internal skills and resources for Life Cycle Costing, establishing an LCC knowledge group consisting of commercial and estimating staff, to highlight cost savings green solutions we can offer to our customers.

Commitment 3: Supporting our supply chain
In 2015 we continued our involvement with the Sustainability Supply Chain School, aiding the development of specialist PM and infrastructure sections to the school. Skanska’s EVP Roger Bayliss help to develop the ‘Build Offsite School’ to promote a more industrialised, efficient construction process with less waste and carbon. The Skanska Supply Chain Green Solutions Award received 35 entries in 2015 with winning presentations being made at the main Skanska conference. Skanska also offer business support, training and specialist advice to the winning entry.

Success story: Redevelopment of Bentley Works
Skanska’s facilities at Bentley Works, Doncaster recently saw significant redevelopment with 5,000m² of workshops developed to the highest environmental standards. Classed as Deep Green in the Skansi Colour Palette, they have a near zero environmental impact and are future proof.

Commitment 4: Measuring and reducing carbon impacts
Skanska continue to develop our carbon footprinting process with 60% of our major projects completing carbon footprint reports. Requirements for the completion of carbon footprint reports are a formal part of our Colour Palette process used by Skanska AB to measure overall environmental performance of its business units which is a key part of our governance structure. Skanska UK’s carbon reduction programme as part of our CEMARS certification. This plan covers, data, facilities, commercial vehicles and staff vehicles.

Commitment 5: Leading and sharing best practice
Skanska has developed over 140 sustainability case studies from across our global activities which are freely available on the internet. These studies include carbon footprint information and examples of embodied carbon reduction in design, specification or delivery. Our case studies form an important part of our external communication strategy. Skanska UK has also played an important role, dedicating specialist staff time, in the ongoing development of the PAS 2080: Carbon Management in Infrastructure standard which is now at consultation stage.

Commitment 1: We commit to enabling carbon reduction on all our major projects
We have established a Sustainable Design Group, led by senior management and comprising key individuals representing our spectrum of consultancy and design services. This network has the skills to guide project designers through consideration of carbon on projects. Collectively the group has sight of all major projects and ensures that the need to tackle carbon is flagged up right from the earliest phase of project delivery. We proactively seek opportunities to integrate carbon reduction into major projects and highlight the benefit of doing so to clients, for example the Clyde City Deal where we are looking to implement the forthcoming PAS 2080.

Commitment 2: We commit to nominating a main board member who will have express responsibility to drive the carbon reduction agenda
The UK business is led by a group of six directors who form the Leadership Team. A member of this group, the interim Managing Director Jeff Davitt, volunteered to take responsibility for sponsoring the carbon reduction agenda. During the last year this has involved overseeing internal carbon management as an active member of the Carbon Management Team, participating in the launch of our internal Sustainable Design Group which examines the carbon footprints of some of our major infrastructure projects and championing carbon literacy by taking part in a series of Carbon Conversations workshops.

Commitment 3: We commit to sharing best practice and promoting greater carbon awareness
Our Sustainable Design Group provides a mechanism for sharing best practice in carbon reduction across business lines. In addition to the development of an e-learning module and workshops around carbon reduction for design teams we have run a carbon literacy and engagement programme called Carbon Conversations. This has prompted the development of a number of additional resources around carbon awareness including a range of Sweco ‘carbon quick guides’ and a game around reducing carbon in water recycling. We bring our skill and passion to our clients/partners, e.g. organising ‘Carbon Week’ in the Anglian Water @One Alliance.

Commitment 4: We commit to reducing our internal carbon footprint
The UK business has measured the carbon footprint of its operational activities since 2012 and received external verification against BS ISO14064 Part 3. Our current Carbon Management Plan sets a target of reducing our carbon footprint (per FTE) by 5% per year over the period 2014-2016 against our 2012 baseline. Actions identified within the plan are owned by the Carbon Management Team comprising stakeholders from across the business, including the Facilities Manager, National Administration Manager and IT Manager. To promote awareness and engagement within the business regular communications are released regarding energy saving and sustainable travel.

Success story: Forth Replacement Crossing
As infrastructure design engineers for the Forth Replacement Crossing, Sweco was able to demonstrate the suitability of spent oil shale (blaes) from a local source as an alternative to quarried material for a substantial embankment (circa 500,000m³) to the north of the new bridge. The reuse of this former waste material provided significant costs savings, as well as carbon reduction in the order of 6000 tonnes CO₂.
Infrastructure Carbon Review - Success Stories

Tarmac is the UK’s leading sustainable building materials and construction solutions business. As such, our innovative services and solutions are critical to delivering the UK’s infrastructure and in creating a more sustainable, lower carbon built environment to support 2050 targets.

Commitment 1: To design CO₂ out of our products and processes
Significant progress has been achieved through investment in energy efficient plant, products and processes. Our new £6.6m Harper Lane asphalt plant is the first of its kind in the UK to use cold Recycled Asphalt Plantings (RAP). In addition it reduces CO₂ levels and produces a range of low carbon products such as ULTILOW, a low temperature asphalt that can deliver carbon footprint savings of up to 25%. We have also increased the use of waste from other sectors. This includes a biomass fuels programme in our cement kilns, an energy optimisation programme and the implementation of an independently certified ISO 50001 Energy Management System across all of our 330 sites.

Commitment 2: To provide product carbon footprints for all products from all production facilities
Tarmac led the way in our sector with the introduction of a product carbon calculator that can measure the cradle to customer carbon footprint of every product from any one of our 330 operations, in accordance with the PAS 2050. We measure carbon in everything from the raw materials we use, to the energy used in manufacturing and transport to our customers’ sites. Since launching the tool we have seen a huge increase in the number of customers asking for carbon footprint information and provided over 3,000 footprints last year. Our tool allows us to support customers in selecting the lowest carbon option for their projects and subsequently track the actual carbon footprint of the project.

Commitment 3: To provide information and tools to help customers adopt lower carbon solutions
To support the early adoption of Building Information Modelling (BIM) practices Tarmac has led the way by being the first company in our sector to launch specific BIM objects for our products. We are also working closely with the UK BIM Task Group to define future data requirements for construction products. The Tarmac BIM objects have been designed to enable customers, designers and specifiers to benefit from the cost and efficiency savings offered by the adoption of BIM. They provide detailed data on products such as Topfloor, a specialist concrete which has been shown to reduce the carbon footprint of industrial floors by up to 20%.

Success story: Heysham to M6 link road.
On the construction of the Heysham to M6 link road, Costain and Tarmac have realised the full potential of collaboration and early engagement. Working in partnership ahead of the project being spade ready allowed Tarmac to review and redesign the original pavement. Together with logistical optimization, this approach has delivered a 21% reduction in the project carbon footprint, exceeding the target. Tarmac designed a bespoke ‘carbon tracking service’ to capture carbon data and show waste reduction and materials.

Commitment 1: We will hold energy/carbon workshops at bid, design and start-up stage to incorporate energy/carbon reduction mechanisms
We have undertaken workshops on all of our recent bids and ensured that the commitments are transferred across to live projects where we are successful.

Commitment 2: We will develop a site set up energy tool which can be used to help facilitate energy/carbon workshops which will also be used to specify energy, carbon and cost efficient systems for temporary site services and accommodation.
This was a commitment we developed as part of our quarterly Energy and Carbon working group sessions. The tool is under development with a planned completion date of end of May 2016.

Commitment 3: We will use the RSSB carbon tool on all future rail related projects, and the Highways England carbon tool for all Highways projects with the aim of reducing the carbon footprint of our projects by 20% where feasible.
We are using the RSSB tool (now referred to as the ‘Rail Carbon Tool’) on all recent rail projects including Filton Bank and Crossrail West projects. The tool is used alongside value engineering exercises (VE) and also the CEEQUAL assessment scheme to consider whole life carbon and help make carbon efficient decisions. We are aiming to reduce the carbon footprint of these schemes by 20% compared to the baseline carbon assessments.

Success story: Crossrail West Stations
We made our formal commitments in December 2015 to the GCB, however we have several project examples of specific examples of reducing carbon and cost. These include at Crossrail West stations, where we calculate all value engineering (VE) savings in terms of carbon savings. We have saved over 100t of carbon through design efficiencies.
Commitment 1: Temple will advocate best practice to our clients by making specific recommendations at the start of projects, helping to set targets and objectives for carbon and resource efficiency and helping to drive and monitor the targets over the lifetime of the project.

We have undertaken an internal improvement project to develop an assessment tool for use when we are engaged by a client to provide consultancy services. The tool identifies opportunities for improvement both within our scope of work and within the client’s wider project. We aim to begin piloting the tool shortly.

Commitment 2: Temple will hold a high-level event with the leaders of our supply chain to explore how we can collectively drive lower carbon solutions and stimulate innovation.

Temple hosts the Building Sustainable Infrastructure Group which facilitates the exchange of ideas and good practice across transport, energy and water infrastructure clients. On 17th March 2016 we held an open forum on delivering the Infrastructure Carbon Review with a packed house discussing and sharing good practice across major infrastructure.

Commitment 3: Temple will provide guidance and training opportunities on carbon reduction and resource efficiency for our employees.

Temple ensures our employees are up to date on the principles of carbon management and changing global initiatives through our Brown Bag Breakfast briefing programme. Our training objectives in 2016-17 reflects our commitment for employees to be able to work with clients to achieve carbon objectives.

Success story: Environmental advisor for the London Overground Capacity Improvement Programme (LOCIP)

Temple has been the programme environmental advisor for LOCIP. Working closely with the client team, and mainly mid size contractors, Temple devised the policy and performance framework and tools for carbon and sustainability then assisted it’s use through procurement, mobilisation and construction of multiple project sites across the network.

Success story: Carbon management as a business tool

At Thames Water we have historically focused on reducing greenhouse gas emissions directly associated with our activities. However, there are significant greenhouse gas emissions (GHG) associated with the goods and services from our supply chain. We want to work with our suppliers to reduce the GHG emissions associated with the goods and services we use.

Commitment 1: Nominate a member of the Executive Team to drive the carbon reduction agenda for capital projects during AMP6 and beyond.

Lawrence Gosden, Managing Director Wholesale Wastewater, is the nominated Executive Team member for Thames.

Commitment 2: Make carbon reduction assessments a requirement of major capital projects by 2016.

During 2015 eight2O, Thames Water’s major capital delivery vehicle, has undertaken a number of carbon management activities for Thames Water to make progress against these commitments and to deliver efficiency savings. Established a 25% challenge for embodied carbon reduction relative to baseline, developed process & tools for carbon assessment, plus guidance for carbon reduction, commenced embedding carbon targets into governance gateways and started reporting carbon performance at programme level.

Commitment 3: Build carbon reduction into capital project procurement requirements.

A priority for eight2O in 2016 is to further develop early supplier engagement together with embedding carbon into our cost-estimating approaches. Our challenge going forward is to inform, train and then measure the performance of our suppliers.

Success story: Environmental advisor for the London Overground Capacity Improvement Programme (LOCIP)

Temple is an environment, planning and sustainability consultancy that provides services to infrastructure and property clients. We consider that it is a business imperative for us and for our clients to respond to the pervasive and irreversible impact on the environment caused by human emissions of greenhouse gases. Infrastructure development and asset renewal provide a significant opportunities in our country to decarbonise and build a sustainable future.

At Thames Water we have historically focused on reducing greenhouse gas emissions directly associated with our activities. However, there are significant greenhouse gas emissions (GHG) associated with the goods and services from our supply chain. We want to work with our suppliers to reduce the GHG emissions associated with the goods and services we use.
Commitment 1: We plan to strengthen our organisational values by establishing carbon as a core value on the project

Since the establishment of Tideway (a new independent company created to finance and deliver the Thames Tideway Tunnel) in August 2015, we have developed and issued our Visions and Values which are supported by our EMS which obtained accreditation to ISO 14001 in October 2015. In September 2015 we appointed our main works contractors who have been instructed to deliver a number of commitments, including to develop a carbon baseline for the construction and an action plan to reduce this impact. To monitor the success of this requirement we have developed a suite of KPIs for both Tideway and its supply chain.

Commitment 2: We plan to improve communication within the organisation regarding carbon

Through the use of our established communication tools, we plan to ensure that carbon is included within the management cascade as one of our core values. We have established a Legacy and Environment Steering Committee which will review, monitor and report the projects progress against a number of sustainability objectives including a commitment to maximise energy efficiency and minimise the carbon footprint of the project.

Commitment 3: We plan to strengthen reporting and governance to reinforce our commitments

To strengthen our reporting we have agreed and issued our KPIs to our main works contractors and included several requirements on carbon within their Works Information, which forms part of their contract. We have also developed a governance structure with the sustainability leads from our supply chain whereby improvements can be discussed and recommendations notified by the Alliance Management Team, which consists of Tideway and our main works contractors.

Commitment 4: We plan to encourage innovation across the supply chain

Building on the work on Crossrail, London 2012 and elsewhere we have developed an Innovation Manager to lead our programme. Working with our partners in the Construction Products Association we have already held an event with our material suppliers to discuss our sustainability requirements and have been working with the BRE on the development of the new BREEAM for Infrastructure scheme, which is being piloted on our project.

Commitment 5: We plan to implement a reward and recognition programme to encourage improvements throughout our suppliers

To strengthen our commitment to reducing our carbon, we have included financial incentives to several of our KPIs which have been agreed with our key material suppliers to discuss our sustainability requirements and have been working with the BRE on the development of the new BREEAM for Infrastructure scheme.

Success story: Strategic Target Schedule impacting project carbon

Since the appointment of our main works contractors, we have instructed them to develop a Strategic Target Schedule with the aim to reduce the overall programme by up to two years and to explore the feasibility of transporting as much of their materials by river as possible instead of road. Both initiatives would significantly reduce the overall carbon footprint and other environmental impacts of the construction phase. To encourage their implementation we are proposing financial incentives for both issues.

Success story: Tracking and benchmarking embodied carbon

We have found that tracking embodied carbon reduction, which relies on clear definitions of ‘before’ and ‘after’, incompatible with the majority of our projects. Therefore, our SiD Group have been collating data from project carbon calculations and developing a database of calculations that can be used to benchmark and track trends in embodied carbon associated with designs. We hope to use this to provide a point of comparison for the detailed design and specification process.
Commitment 1: To minimise the impact of service and infrastructure upgrades on our overall energy consumption

The New Tube for London programme is coordinated series of modernisation schemes for the Piccadilly, Waterloo & City, Bakerloo, and Central lines delivering much-needed capacity uplifts (up to 60% for the Piccadilly Line) on over one third of the network. One of the sponsor requirements for the programme is to deliver this capacity increase with no increase in electricity consumption over pre-upgrade levels. This has already been achieved with the Victoria Line upgrade.

Commitment 2: To measure, monitor and seek to reduce the carbon emissions associated with major project delivery, working closely with our suppliers to identify innovative ways to reduce emissions and improve project value

The redevelopment of Camden Town Station is being used as a proof of concept for reducing carbon and reducing cost. We used the rail industry standard RSSB Carbon Tool to calculate the capital carbon impact of redevelopment plans for Camden Town Station, which includes construction of a completely new station building, escalators and lifts as well as new cross passages between platforms. The procurement exercise during 2016/17, we will be challenging our supply chain to deliver capital and operational carbon reductions against a whole life carbon baseline.

Commitment 3: To utilise our existing infrastructure more efficiently by making use of waste heat from London Underground tunnels to support London’s energy needs

We are working with Islington Borough Council on a project to utilise our waste heat in delivering an extension to their Bunhill District Heating Scheme. The innovative project will capture the waste heat from our City Road ventilation shaft in the winter and provide hot water, boosted via a heat pump, to local residents thus removing the need for gas fired boilers.

We also ran a pilot to evaluate the potential to utilise the waste heat from the Northern Line tunnels to support the requirements of Holborn station.

Success story: Energy recovery

London Underground trialled the world’s first inverting substation energy recovery technology on a metro line. As well as feeding energy regenerated by braking trains back into the traction power supply, the inverting substation can return power to the grid when it is not required by accelerating trains. The equipment installed at the Victoria Line’s Cloudesley Road substation recovered 7MWhrs in its first week of operation, equivalent to two days’ power requirement of Holborn station.

Energy used in the construction and operation of the built environment accounts for around half of the UK’s total GHG emissions. The UK-GBC’s Mission is to radically improve the sustainability of the built environment. We work to inspire best practice and leadership, influence government and policy, and impact our members’ sustainability performance.

Commitment 1: We commit to holding a high-level event with the leaders of our supply chain to explore how we can collectively drive lower carbon solutions and stimulate innovation

Since October 2014 our work on the Leaders Network and Future Leaders programme has continued.

We have also held a number of specific events to collectively drive lower carbon solutions and stimulate innovation. We have particularly focused on the emerging theme of embodied carbon. One highlight was the Embodied Carbon Conference 2015. The conference addressed the key issues raised in the final report from 2014’s Embodied Carbon Week’s and set out activity to enable industry to collectively take action and implement plans for making real change within the sector.

Over 75 delegates, from over 50 companies, attended to get an industry update on current initiatives but also review next steps to enable real and progressive change across the industry. The aims of the conference were to:

• Review the current state of play and development around embodied carbon, responding to the findings from Embodied Carbon Week.
• Assess industry action needed to reduce embodied carbon, delivering on the Construction 2025 target of 50% reduction in GHG emissions.
• Hear from practical examples of reducing cost and carbon through innovation in products, buildings and infrastructure.

We further helped our members to understand their role in reducing embodied carbon within the built environment by publishing a guide for the client sector (www.ukgbc.org/resources/publication/tackling-embodied-carbon-buildings).

The guide addressed themes applicable to the whole of the built environment including equipping clients with the information they require to be able to discuss embodied carbon with design teams and issues around measurement of embodied carbon and availability of data.
**Commitment 1**: Hold a high-level event with the leaders of our supply chain to explore how we can collectively drive lower carbon solutions and stimulate innovation

We held an engagement event on the topic of carbon management in 2015 with our supply chain through our Principal Contractors Forum and have a work stream in the strategic plan for our newly launched capital delivery alliance which will look to target specific initiatives that will yield both cost and carbon efficiencies. This work is phased over the next few years to include the development of a carbon baseline. See also Commitment 3.

**Commitment 2**: Nominate an executive director who will have responsibility for driving the carbon reduction agenda

We have restructured our executive management team and the nominated director to lead this agenda is Barry Hatton, Director of Asset Management at UK Power Networks.

**Commitment 3**: Use the carbon maturity matrix to identify areas for development and to implement an action plan for driving improvement

We are integrated into an Alliance partnership along with four delivery partners to complete our major capital programme through our regulatory period to 2023. We plan to use the Alliance delivery model and the associated strategic workstream to progress along the maturity model over the coming few years.

**Commitment 1**: To prepare a carbon management plan for all our major projects by 2016 where clients are agreeable

On several major projects, we have been working to reduce carbon use. This is mainly as a specialist service, which is included where the client instructs it.

**Commitment 2**: Build carbon reduction into our procurement processes

Our UK Supplier Code of Conduct requires all our Suppliers to reduce environmental impacts, including those contributing to climate change, which are also addressed in our supplier setup assessments. Our staff seek to reduce carbon in our Infrastructure projects procurement work, although we do not currently require them to do so.

**Commitment 3**: Offer a short course on carbon management in design in all our UK offices in 2016

We are currently preparing a short course in carbon management in design, which we expect to make available in all our UK offices in 2016.

**Commitment 4**: Nominate an executive director who will have responsibility for driving the carbon reduction agenda

We have nominated Mike Sheehan, our UK Director of Sustainability, who has been driving our company’s carbon agenda in the UK since 2009.

**Success story: Great Western Electrification Programme**

We developed a Lead Design Organisation Carbon Footprint for the Overhead Line Equipment materials of the Great Western Electrification Programme (GWEP).

We identified that over 2,800 tCO\textsubscript{2}e of Embodied Carbon could be saved by reducing OLE mast steel thicknesses and foundation sizes – a demonstrable link between a sustainable approach and Evolve. We also found savings from diverting waste from landfill. Our clear data and results contributed to Network Rail’s and GWEP sustainability objectives.
Success story: Endorsing the Infrastructure Carbon Review

Endorsing the ICR and developing our company-specific commitments has been a catalyst to significantly progress our tools, processes and systems, thereby enabling us to establish our embodied carbon baseline. We are now able to robustly capture and assure carbon data to monitor and measure performance, as well as continually improve and update our models. This opens the doors to our broader ambitions of lower carbon, integrated and sustainable assets.

Commitment 1: We will measure and monitor our carbon emissions to inform more sustainable operational and investment decisions. We will share our learning at the Accounting for Sustainability Network

We have established the whole life carbon baseline of our business plan 2015-2020 and are developing tools to benchmark against it. Our Tier 1 framework partners are now reporting embodied carbon on scheme completion. This drives continual improvement in our models as we are starting to understand where the carbon hotspots are in our new assets and then challenge it out through our decision making processes.

Commitment 2: We will complete a sustainability risk assessment for all new contracts and work with our supply chain to reduce carbon emissions. We will support our customers to save water and the carbon associated with it

In 2015/16 we developed a new procurement risk management system and continue to evolve tools that embed carbon as a key decision making factor throughout procurement and contract management. We are working closely with our Tier 1 framework contractors to measure and monitor carbon and are working on customer facing projects that highlight the relationship between water efficiency and carbon reduction. Through the Infrastructure North group we are working with local housing associations to provide energy and water saving benefits.

Commitment 3: Inform future investment by researching integrated water management plans and trialling at least three innovative asset management solutions as part of our five year investment programme

Our Sustainable Assets and Services Policy describes our drive to transform the way we design, manage and operate our assets to meet current and future challenges, including resilience and carbon mitigation. We are trialling innovative solutions such as integrating waste, water and resource management at our treatment sites to deliver carbon reduction, cost efficiency and opportunities for growth.

Commitment 4: We will secure certification to the ISO 55001 asset management standard by 31/03/17

During 2015/16 we have been making the necessary preparations for Yorkshire Water to secure certification to ISO 55001 before the end of March 2017. This is improving our ability to manage the processes and procedures associated with, amongst other key factors, the whole life carbon across each of the work stages of our assets. In addition we are understanding how we might apply PAS 2080:2016 to help further shape our carbon emissions management.

Commitment 5: We will continue to reduce our operational carbon emissions and maintain certification to the Carbon Trust Standard

We are forecasting our lowest ever reported operational carbon emissions in 2015/16, outperforming our target of 356ktCO₂e, continuing to reduce our operational emissions from our 2008 baseline and therefore renewing our Carbon Trust Standard. We are reducing energy consumption through sustainable capital investment, operational efficiencies and a targeted training programme. We continue to drive self-generation and now have capacity to produce approximately 12% of our total consumption, primarily through digestion and thermal hydrolysis of sewage sludge. This maximises the value we can take from waste materials whilst reducing carbon associated with its disposal.

Commitment 6: We will strive to halve the carbon emissions (CO₂e) embedded in the new assets we build by 2020 (from a baseline in 2015)

We continue to measure and monitor our operational carbon emissions and report them as a KPI on our director level scorecard. This is reported externally through our Annual Report and Accounts and benchmarked across the Industry. We use this data along with energy consumption data to identify opportunities for efficiency in our assets and operations.
Infrastructure Carbon Maturity

Are you high carbon and high cost, or low carbon and cost-efficient?

ICR signatories have gauged their levels of ‘carbon maturity’ using this simple matrix. The overall average carbon maturity is increasing across the infrastructure value chain - reflecting a combination of growing maturity of the early signatories and new signatories beginning the carbon journey.

Where are you? Assessing your maturity can help you to identify and prioritise actions to improve carbon and cost-efficiency in your organisation.

The whole supply chain stands to gain from driving down carbon - cutting costs and improving profitability, providing the opportunity to drive asset and service improvements further and faster than possible in the past.

Clients have started to demand carbon and cost reductions as they realise the potential value to be gained.

Consultants stand to win additional work helping clients to plan cost saving carbon reduction strategies. The technical and commercial knowledge that they gain will make them more competitive in international markets as well as at home.

Contractors and Suppliers are already challenging conventional construction methods to improve efficiency and competitiveness – for example, using design for manufacture and assembly, no-dig solutions and materials replacement.

The Infrastructure Carbon Maturity Matrix 2015-2016
Self assessed carbon maturity by clients, consultants, contractors and suppliers demonstrating overall maturity level across the five Infrastructure Carbon Review measures and relative performance year on year 2015-2016.

Three Key Challenges

1. Advancing Commercial Models
Share risk and reward low carbon innovation, making carbon central to procurement

2. Getting clients to demand carbon reduction, accept innovation and accelerate the pace of change
The value chain must find ways to exert influence.

3. Setting standards for carbon measurement
Over 90% of ICR signatories are measuring carbon but there’s little consistency in methods or data. The new PAS 2080 will help with this challenge.

What are you going to do now?
Five steps you can take

1. Provide strong and effective leadership
Articulate carbon as an organisational value and provide a vision of how the company should address it, underpinned by clear and consistent policy

2. Embed carbon in your organisation’s culture
Make it part of the DNA – by communicating to change behaviours, sharing best practice and developing new low carbon skills

3. Measure performance, set targets and beat them
Set a baseline and report on progress against it, using the insight gained to inform strategic decisions

4. Support innovation
Challenge your supply chain to reduce carbon, defining outcomes but allowing creative freedom over the process, and by enabling standards and specifications to be challenged

5. Bake carbon into procurement
Make carbon reduction a prerequisite for winning work, integrating your supply chain, managing risk effectively and rewarding outperformance of your targets.

- Sign up to the Infrastructure Carbon Review and get started
- Pledge action on cutting carbon and cost
- Join a network embracing the low carbon agenda
- Download and implement the PAS 2080

For full details visit www.greenconstructionboard.org
To find out more about the work of the Green Construction Board, please visit:

www.greenconstructionboard.org