

SOLVING
TOMORROW'S
SUSTAINABILITY
CHALLENGES

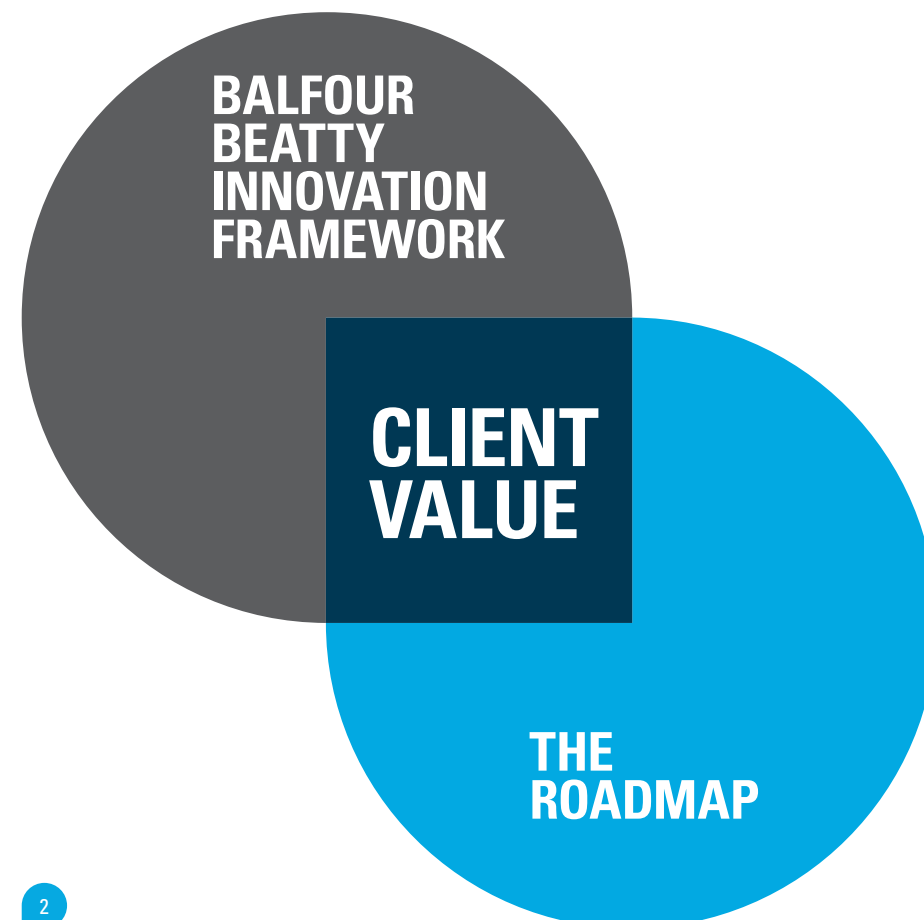


WHAT IS S-INNOVATION?

S-Innovation is Balfour Beatty's sustainable innovation programme.

It flows from and is complementary to the new Roadmap.

It is also one of the three themes of the Balfour Beatty Innovation Framework, the others being '**Where Physical meets Digital**' and '**Delivering Outcomes**'.



WHAT IS THE OBJECTIVE OF S-INNOVATION?

S-Innovation aims to accelerate the sustainable innovation that is already happening in our business and is showcased in the remainder of this brochure.

It will do that by:

- Connecting up internal innovators
- Acting as a catalyst for strategic alliances with third party innovators
- Showcasing leading innovations



HOW ARE WE DOING SO FAR?

The remainder of this brochure showcases some of the sustainable innovations that we have developed to date.

Those innovations follow the four focus areas for S-Innovation:

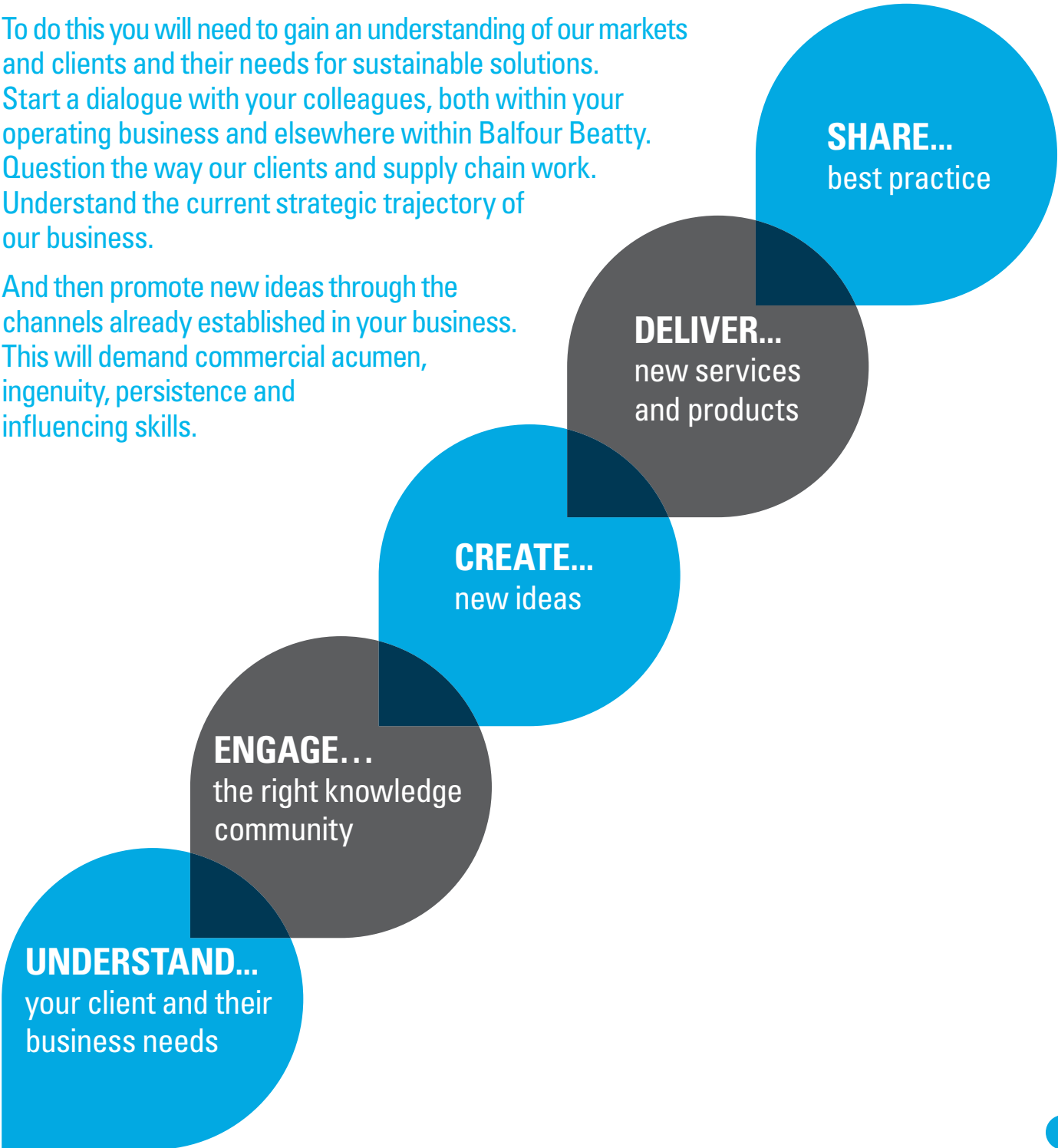
NEW PRODUCTS	Products that support the drive by our clients for decarbonisation of their businesses and for energy and resource efficiency.	<ul style="list-style-type: none">RenewablesZero carbon buildingsEnergy efficiencyMaterials
CLIENT VALUE ACCELERATORS	Tools that facilitate engagement with our clients on key sustainability related issues including greenhouse gas emissions, climate change and biodiversity.	<ul style="list-style-type: none">Carbon footprintingWater footprintingClimate change adaptationBiodiversity
EFFICIENCY	Continuous improvement programmes aimed to eliminate rework, increase re-use and recycling and increase operational efficiency.	<ul style="list-style-type: none">Eliminating rework through BIMRe-use and recyclingElectrosynthetic geokinetics
SOCIAL PERFORMANCE	Social performance programmes that shape our contribution to society and ensure that our projects and services create a lasting legacy.	<ul style="list-style-type: none">Building Better FuturesOur ParklifeBalfour Beatty ApprenticeshipsHeathrow Sustainability Partnership

HOW CAN I GET INVOLVED?

S-Innovation utilises the innovation infrastructure that already exists in your operating business. You can contribute by working with the grain of that infrastructure to generate and exploit new ideas.

To do this you will need to gain an understanding of our markets and clients and their needs for sustainable solutions. Start a dialogue with your colleagues, both within your operating business and elsewhere within Balfour Beatty. Question the way our clients and supply chain work. Understand the current strategic trajectory of our business.

And then promote new ideas through the channels already established in your business. This will demand commercial acumen, ingenuity, persistence and influencing skills.



NEW PRODUCTS

These are products that help our clients decarbonise their businesses, reduce their resource use and lower their running costs, including maintenance and lifecycle replacement.



RENEWABLES

WIND POWER

OFFSHORE

Balfour Beatty has been appointed Preferred Bidder for Thanet and Greater Gabbard OFTOs (Offshore Transmission Operator) during Transitional Round 1. Balfour Beatty will acquire and operate the assets throughout the 20 year licence period. The Enduring regime will follow the Transitional regime and covers projects currently at the design stage. The phasing of these later tenders is uncertain but represents c.£20bn of transfer value.

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ONSHORE

Balfour Beatty is currently approaching an impressive 1GW of installed green energy capacity delivered across various small, medium and large scale onshore wind farms. This significant green energy achievement also includes the delivery of Whitelee Wind Farm near Glasgow and a subsequent extension, which currently makes it Europe's largest onshore wind farm with a generating capacity of 539MW.

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BIOMASS POWER

Eco2 has chosen Balfour Beatty as preferred bidder to finance and build a £110m 38MWe straw burning power plant at Brigg in Lincolnshire. The construction will be undertaken in joint venture with technology provider DP Cleantech.

The project is due to close by the end of 2012.

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BIOMASS CONVERSION

A number of UK coal fired power stations are carrying out detailed studies to define and cost the co-firing or full conversion of their assets from coal to biomass-fired. Parsons Brinckerhoff has undertaken several detailed commissions in this sector including responsibility for overall project management of Front End Engineering Design (FEED) studies and execution of civil works, fuel storage and fire protection, handling and preparation equipment to achieve high conveying rates, screening and sampling equipment, design engineering of the mechanical and electrical tie-ins and cost estimation with an accuracy of -5 to +10% for the Execution phase work.

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RENEWABLES

SMALL SCALE HYDRO POWER

With WS Atkins as consulting engineer, Balfour Beatty is building a £1.5m small-scale hydroelectric scheme at Longbridge Weir on the River Derwent. The £1.5m scheme will generate around 1.3million kWh per year, enough 'green' electricity for over 300 average households, equivalent to a saving of at least 1000 tonnes of CO₂ per year from UK coal-fired power stations.

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CONCENTRATED SOLAR POWER

Parsons Brinckerhoff are one of a consortium of companies participating in a feasibility study for a concentrated solar plant of 200MW capacity for Botswana Power Corporation. The most recent such plant, Gemasolar in Seville, generates 20MW and, by utilising a reservoir of molten sodium chloride, is able to do so 24 hours a day.

Parsons Brinckerhoff are providing advice on mechanical engineering, electrical engineering, civil engineering and control and instrumentation. The study includes the evaluation of the potential for local component manufacturing. In connection with this Parsons Brinckerhoff would train local mechanical and electrical engineering personnel.

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RENEWABLE HEAT INCENTIVE

The UK Government's Renewable Heat Incentive (RHI) provides financial support to users generating renewable heat and producing biomethane. The scheme will initially target domestic buildings and then expand to include non-domestic buildings and a wider range of technologies. Mansell Energy provide biomass, solar thermal, ground source heat pumps and water source heat pumps in connection with the RHI.

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SOLAR PHOTOVOLTAIC

Photovoltaic cells were installed at Mansell's Stourbridge office in just two days, reducing the energy costs of the building by £920 per annum. The ZNShine 250Wp panels have a 90% 25-year efficiency guarantee. Mansell is a Microgeneration Certification Scheme (MCS) accredited company able to survey, design, install and maintain systems in accordance with MCS standards.

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ZERO CARBON BUILDINGS

LADY BIRD JOHNSON SCHOOL, TEXAS

This is the largest net zero carbon middle school in the US and the first such school in Texas. It incorporates a solar array that covers 66% of its roof, 105 water source heat pumps that reduce energy demand for heating and cooling by 30% and 12 demonstration scale wind turbines. In addition it features rainwater harvesting, a 1.8km deep well for irrigation water and low VOC and recycled materials throughout. Achieving net zero added 12% to the capital cost of the school, with a payback period at current utility rates of 12 years.

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ZERO CARBON OFFICE, HONG KONG

Built for the Construction Industry Council in just 11 months, this US\$19 million 5,000m² two-floor building will offset both embodied carbon and operating carbon over its design life by producing more energy than it consumes. 225 MWh of electricity will be generated on site, of which 30% will come from solar panels and 70% from biodiesel made from locally sourced cooking oil. The building is constructed from low carbon and low impact materials including concrete with recycled aggregate and FSC timber.

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M&S CHESHIRE OAKS ECO STORE, UK

Marks & Spencer's Cheshire Oaks store is one of the most high profile sustainable retail projects ever undertaken in the UK. Designed to achieve a BREEAM 'Excellent' rating, the new 148,000ft² store incorporates a range of sustainable technologies and building materials to deliver energy and carbon savings of between 30% and 35% when compared to the company's traditionally built stores.

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GAMMON PROJECT PORTFOLIO

10 out of the 13 major building projects that Gammon has under design or construction in Q4 2012 are LEED or BEAM certified, making Gammon Hong Kong's most prolific constructor of low carbon buildings. They include the LEED Platinum Hysan Place, and Platinum Plus Science Park phases 3a and 3b. The US\$800 million Midfield Concourse Works at Hong Kong International Airport will incorporate over 35 green features to target BEAM Gold Plus Standard certification.

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ENERGY EFFICIENCY

TRACK POINT HEATING

In cold weather conditions the mobile parts of the track point mechanism can freeze. The electric heaters that are used to combat this are normally controlled by stand-alone systems deployed adjacent to the points or by comparatively crude remote supervision, and are not flexible enough to optimize energy consumption.

In collaboration with ADIF, Balfour Beatty Rail Spain has developed a remote 3G control system to programme and adjust the heating settings for track points. Balfour Beatty Rail Spain are currently conducting tests to validate the energy savings of this innovation.

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THE GREEN DEAL

The UK Government's Green Deal, effective from October 2012, offers domestic properties the opportunity to install up to £10,000 of energy efficient products, with finance based on the estimated energy savings of the completed work. Mansell Energy provides loft insulation, solid and cavity wall insulation, double glazing, energy efficient lighting and boiler upgrades.

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POWER EFFICIENCY

Power Efficiency is a leading UK energy procurement and carbon reduction consultancy within Balfour Beatty Group with a proven track record in helping clients improve their energy efficiency, cut costs and shrink their carbon footprint. It uses a suite of integrated services spanning procurement, compliance, strategy, implementation, operations and maintenance.

Power Efficiency's clients include CBRE, Credit Suisse, Vue Cinemas, Wagamama and PwC.

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SWITCH 4 GOOD

Switch 4 Good is a smart grid programme run by Balfour Beatty and involving, in its first phase, 5,300 military homes on 11 bases in 5 states. The programme involves the installation of smart meters, the provision of energy and habit data and analytics through a web portal, personalised tips via text messaging, home visits from a 'personal trainer' and helpline support. The programme is a recipient of U.S. Department of Energy Smart Grid Grant.

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STREET LIGHTING

Balfour Beatty's Coventry Street Lighting PPP saw the UK's most extensive deployment of dimming technology and reduced the Council's energy use for street lighting by 38%. The Balfour Beatty team went on to deliver a 49% reduction in Cambridgeshire and 64% in Northamptonshire through the removal of unneeded lighting, new reduced energy lanterns, stepped dimming and reduced energy feeder equipment.

In North East Lincs Balfour Beatty will achieve a 35% saving in energy through the deployment of an Esco model that is self financing.

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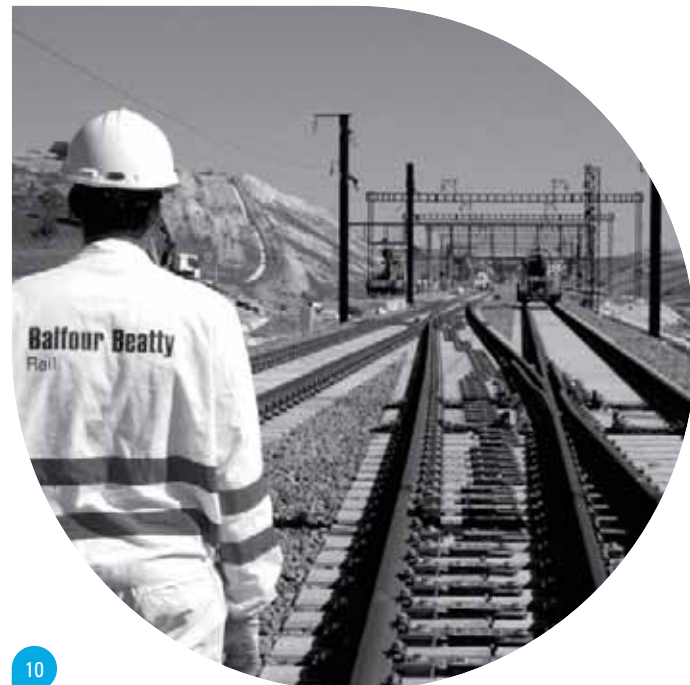


IMAGE CAPTION: A COLLABORATIVE BALFOUR BEATTY-ADIF (NATIONAL RAILWAYS INFRASTRUCTURE ADMINISTRATION) WORKING GROUP HAS BEEN COMMISSIONED WITH THE OBJECTIVE OF OPTIMISING ENERGY CONSUMPTION IN HEATING POINT SYSTEMS

MATERIALS

XiTRACK

XiTRACK is a quick-setting liquid polyurethane that partially fills the voids between track ballast, penetrating to a pre-determined depth. In doing so it fixes the track horizontally and vertically, improves the ride quality and greatly reduces maintenance costs. It achieves the latter by reducing or eliminating tamping and manual interventions, which also gives rise to improved passenger and operative safety.

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XiSPAN

XiSPAN is a sister product to XiTRACK which, when applied to the track ballast over a masonry arch bridge, creates a 'raft', which serves to distribute loads more widely over the bridge. This enhances the load carrying capacity of the bridge without the road closures, cost and carbon footprint of conventional solutions such as stitches, rigid anchors and concrete saddles.

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GLASS SAND

Glass sand is a recycled aggregate made from glass bottles and jars in accordance with the WRAP Quality Protocol for the production of aggregates from inert waste. On the A3 Hindhead Balfour Beatty used it as a constituent of the cement bound material (CBM) within the lower road base. It was also used as a filter layer and protective layer, delivering a total cost saving to the client of £190,000.

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IMAGE CAPTION: NORTHAMPTONSHIRE STREET LIGHTING INSTALLATION BY BALFOUR BEATTY

CLIENT VALUE ACCELERATORS

These are diagnostic and analytical tools that provide our clients with insight on key sustainability issues including greenhouse gas emissions, climate change and biodiversity.



CARBON FOOTPRINTING

Parsons Brinckerhoff prepared a whole life carbon footprint for law firm Wragge & Co's £50m Snow Hill 2 headquarters building. This included consideration of the carbon emissions associated with manufacturing, transport, on-site construction and operation. The results revealed that after 50 years of operation, lighting could account for up to 52% of emissions and heating 13%, whilst building manufacture contributed 16%.

The introduction of an improved lighting scheme saved 24% of the lifecycle emissions, or 89,570 tonnes CO₂.

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WATER FOOTPRINTING

Parsons Brinckerhoff has developed a suite of water footprinting tools for the construction sector. The tools take account of both the volume of water used and the scarcity of water in the region from which it was taken, to provide an overall impact. The tools cover both 'direct' water and 'indirect' water (i.e. that associated with purchased materials) and were applied at Heathrow T2B, where indirect water use was shown to be around 35 times greater than direct water use.

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BIODIVERSITY

Chris Britton Consultancy of Balfour Beatty Group has trialled a measurement tool of biodiversity. Tested on rail and road projects, the tool provides for a more objective assessment of ecological resources on project sites. This adds value by quantifying biodiversity and providing evidence on 'no net loss' or 'net gains' for both Balfour Beatty and our clients. It also provides for robust and efficient decision-making on enhancements and biodiversity offsetting. Both Natural England and DEFRA have been involved with the development process.

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CLIMATE CHANGE ADAPTATION

Parsons Brinckerhoff is working with Luton and Cardiff Airports to prepare Climate Adaptation Reports pursuant to the Climate Change Act 2008. This involves identifying areas of vulnerability to climate change, engaging key internal and external stakeholders and developing an assessment framework to help prioritise risks.

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ECOLOGY APP

Recognised by both KPMG and DNV as best practice, Balfour Beatty Living Places have developed a Habitat and Ecological Compliance (cHECK) application. cHECK is a quick and simple tool for environmentally assessing a site, using smart tablets for field use. Answering a few simple multiple choice questions allows the app to analyse the ecological sensitivity of the site and the work activity to provide a bespoke assessment. This includes the risk level of working within the site, and specific mitigation measures.

Additional app features include the ability to produce layered OS maps from ArcGIS, the ability to take photos of the site to add to the assessment and detailed guidance and information allowing users to complete the assessment as accurately as possible.

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IMAGE CAPTION: SNOW HILL 2, A £50 MILLION OFFICE DEVELOPMENT IN CENTRAL BIRMINGHAM, WAS ORIGINALLY DESIGNED TO ACHIEVE A RATING OF BREEAM EXCELLENT 2006. BALFOUR BEATTY ROSE TO THE CHALLENGE AND OFFERED THE FAR MORE ADVANCED SOLUTION OF BREEAM EXCELLENT 2008, WITH THE OPTION TO ACHIEVE BREEAM OUTSTANDING.

EFFICIENCY

These innovations are aimed at eliminating waste from our delivery processes. They also include breakthrough innovations that enable us to deliver products and services at lower cost with less impact on the environment.



DELIVERING NETWORK INTELLIGENCE

Working with specialist technology supplier JD7, Balfour Beatty Utility Solutions' new network intelligence service will provide clients in the water market with unprecedented data about their networks. Equipment with the ability to scan and assess the inside of live water mains allows for 'keyhole' surgery of underground assets, reducing disruption, material waste and risk. The service will be available to the gas sector in the late 2013.

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KING SHEET PILE RETAINING WALL

Invented by David Baker, Balfour Beatty Major Civil Engineering's Design and Geotechnical Manager, the KSP (King Sheet Pile) system (Patent Pending) is a radical new form of sheet pile wall that revolutionises 120 years of steel sheet piling practice. Sheet pile walls often require heavier sections for drivability than required structurally for the retaining wall function and therefore have considerable surplus structural capacity. KSP exploits this with lighter short sections spanning horizontally between 'King' piles.

Typically, KSP saves close to 40% of the steel in a conventional sheet pile wall and has been proven to increase productivity, a key factor in its outstanding success on the M25 DBFO.

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RE-USE AND RECYCLING ON THE A421

In addition to using recycled aggregates and pulverised fuel ash to replace traditional fill materials, the A421 pioneered the first application of car tyres for lightweight fill on a major road scheme in the UK. The Highways Agency's carbon calculator was used to estimate the project's carbon footprint and in particular the embodied energy associated with materials used in the scheme. Reducing cost goes hand in hand with delivering reductions in the carbon footprint of the project and the use of recycled materials and PFA saved the project £3.8m.

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IMAGE CAPTION:
THE APPLICATION OF CAR TYRES FOR LIGHTWEIGHT FILL ON THE A421

TECHNOLOGY STRATEGY BOARD RETHINKING THE BUILD PROCESS

The UK construction industry generates 32% of landfill waste (WRAP, 2007). Existing research demonstrates that the optimum approach to the minimisation of waste is for it to be considered during the design stage of a building. However there is currently no tool that designers and contractors can use to successfully predict and reduce construction waste during this phase.

Balfour Beatty Construction Northern/Balfour Beatty Capital have been successful in attracting TSB grant funding to develop an intelligent BIM system using early supply chain involvement to tackle the problem.

The tool will allow for:

- prediction of quantities and identification of sources of waste at design stage
- material re-use and recovery
- off-site construction
- waste efficient procurement and
- deconstruction and flexibility.

The research is to be trialled on Balfour Beatty Construction Northern/Balfour Beatty Capital's Gloucester EFW Project

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CLOSED LOOP PLASTICS RECYCLING

A first within the utilities industry, Balfour Beatty Utility Solutions has implemented a closed loop recycling system for its waste plastic. Working with supply chain partners, the scheme involves the collection of waste from over 100 sites nationwide, before it is taken for processing and remanufactured into cable protection covers for use in cabling and gas operations, giving complete control of the plastic waste stream and returning a usable, practical output. Through this scheme around 200 tonnes of waste will be recycled each year, giving total carbon savings of around 2500 tonnes.

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ELECTROSYNTHETIC GEOKINETICS

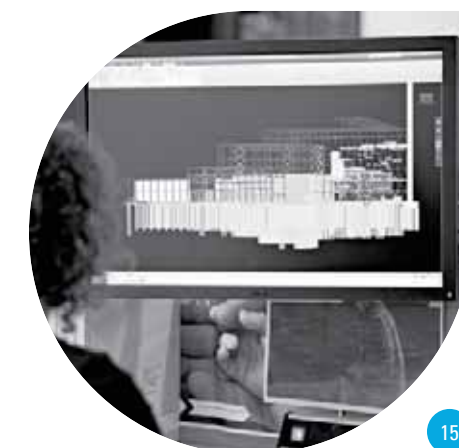
Unstable embankments are a common problem on the highway network and pose a risk to motorists. The most commonly used stabilisation methods involve the import of large quantities of quarried material and the export of waste soil. On the A21 at Stocks Green, Balfour Beatty Mott MacDonald used electrosynthetic geokinetics to consolidate the soil. This technique involved the application of a small voltage to the soil through 195 rods and achieved a 76% reduction in carbon footprint relative to conventional methods.

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ELIMINATING REWORK THROUGH BIM

Balfour Beatty is utilising Building Information Modelling (BIM) on all major building projects. This involves using digital toolsets to visualise the building, optimise and integrate the design information, collaborate, and simulate the build. BIM will enable us to get things right first time, eliminating the waste associated with rework due to poor coordination, and support off-site manufacture, making site operations more efficient and safe.

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SOCIAL PERFORMANCE

Social performance programmes shape our contribution to society and ensure that our products and services create a lasting legacy. They are key to both our existing and emerging markets.



BUILDING BETTER FUTURES

Every year Balfour Beatty's network of charity champions work with representatives of Balfour Beatty's three principal charity partners – The Prince's Trust, Action for Children and Coram – to support their fundraising efforts. Every pound raised by an employee is matched by the company.

Employees run the London Marathon, the Windsor Half-Marathon, they cycle from Buckingham Palace to Windsor Castle, from Land's End to John O'Groats and to Paris and Cannes. They bake and sell cakes, run golf tournaments, stage 'It's a Knockout' competitions and organise dress-down days and black-tie dinners. In 2011 all this activity raised £300,000.

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OUR PARKLIFE

'Our Parklife' is a social enterprise which will directly employ 250 local people to provide services to the neighbourhoods surrounding the Queen Elizabeth Park in the years following the Olympic Games. Many of the employment opportunities will be on an intermediate labour market basis, thereby providing a bridge for young people into mainstream employment. The enterprise will also provide a focus for training in environmental sustainability.

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BALFOUR BEATTY APPRENTICESHIPS

Named as one of the Top 100 Apprentice Employers of the Year by the National Apprenticeships Service and City & Guilds, Balfour Beatty Apprenticeships employs the apprentice and places them with subcontractors. In this way the apprentice is afforded continuity of employment when subcontractor workload fluctuates and we have been able to commit to 65% of our apprentices becoming fully qualified, against an industry average of 45%.

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SOLUTIONS FOR THE PLANET

Solutions for the Planet provides the opportunity for every young person, teacher, parent, community, organisation or business engaged in the provision of education to come up with, and implement, a 'Big Idea' that will improve society, the economy and the environment. Balfour Beatty Utility Solutions supports the programme in the Yorkshire region, both as a sponsor and through providing industry experts and judges to help facilitate the programme. Solutions for the Planet also offers a wealth of new and fresh ideas for the business from young people who have not yet had their thinking coloured by the corporate world.

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HEATHROW SUSTAINABILITY PARTNERSHIP

In 2010, BAA set out to deliver a more sustainable Heathrow by developing a series of targets and action plans that would address some of the key sustainability issues associated with maintaining and operating a world class airport. It did this in conjunction with its business partners and Balfour Beatty which has contributed with the knowledge and expertise developed on other major projects such as Blackfriars, London 2012 Aquatics Centre and the BSF Schools programme. In particular Balfour Beatty has led on the establishment of a Construction Academy, creating employment opportunities for local people with Balfour Beatty and its supply chain. This part of BAA's sustainable employment programme has delivered 50 new construction jobs for unemployed local residents to date.

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WHAT THE WORLD IS SAYING ABOUT SUSTAINABILITY

**"MANDATORY
GHG REPORTING
FOR LSE FIRMS"**

DEFRA, 20 JUNE 2012

**"BY 2020, THIS SECTOR
[CLEANTECH] WILL
BE EMPLOYING
MORE PEOPLE THAN...
THE AUTOMOTIVE
INDUSTRY"**

TORSTEN HENZELMAN IN DEUTSCHLAND,
THE GERMAN GOVERNMENT QUARTERLY
JOURNAL, SPRING 2012

**"...ONE OF THE
GREATEST WEALTH
GENERATING
OPPORTUNITIES OF
OUR GENERATION"**

SIR RICHARD BRANSON

**"39% [OF CDP MEMBER
COMPANIES] WILL SOON
BEGIN DESELECTING
SUPPLIERS THAT DO
NOT ADOPT [GOOD
CARBON MANAGEMENT
PRACTICES]"**

CDP SUPPLY CHAIN REPORT 2012

**"I WANT TO WORK
WITH SUPPLIERS
THAT DON'T JUST
ADVISE ME ON WHAT
TO DO, BUT ALSO
PUT THEIR OWN
HOUSE IN ORDER"**

SIMON BARNES, HEAD OF INNOVATION
DELIVERY AT YORKSHIRE WATER,
25 JULY 2012

**"AUSTRALIA PASSES
CONTROVERSIAL
CARBON TAX"**

BBC NEWS, 1 JULY 2012

**"WE WANT TO
DECOUPLE
GROWTH FROM
ENVIRONMENTAL
IMPACT"**

STEVE HOLLIDAY, CHIEF EXECUTIVE,
NATIONAL GRID,
12 SEPT 2012

Balfour Beatty

www.balfourbeatty.com

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