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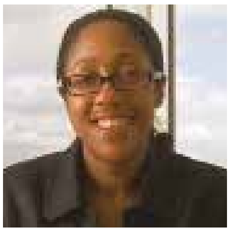

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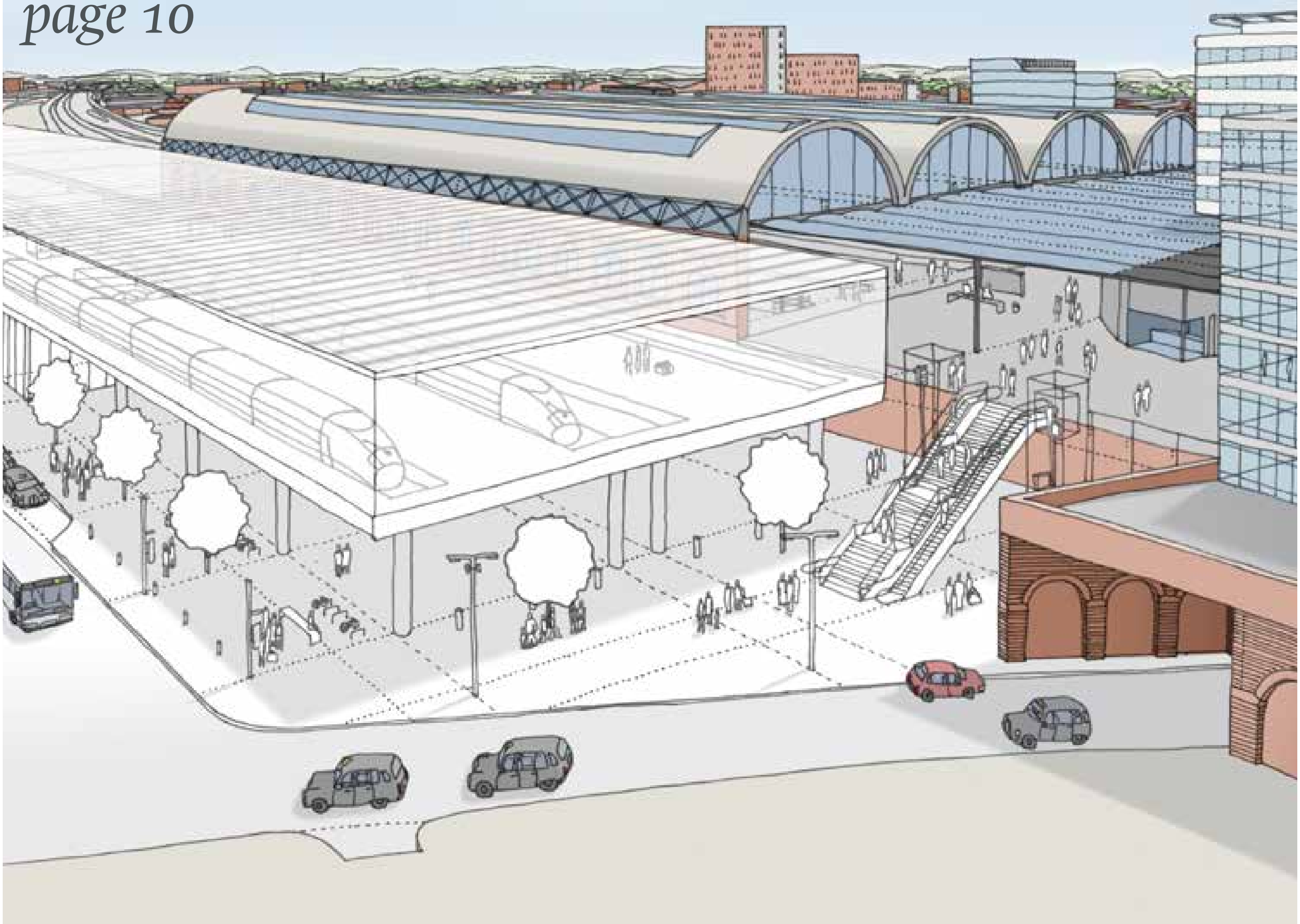

INFRASTRUCTURE Intelligence

Produced for the industry by the Association for Consultancy and Engineering

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MESSAGE FROM THE EDITOR

Prime Minister David Cameron highlighted five challenges for government during his speech to the CBI annual conference this month.

These included controlling the cost of government, boosting enterprise and the private sector, getting Britain back to work and investing in infrastructure.

His fifth and final challenge was rebalancing the economy - tackling the debilitating north-south divide that has seen just one post-recession job created in the Midlands or the North for every ten in the south of England.

"That isn't good enough," he said. "I want us to build a recovery and an economy that is rebalanced between north and south and frankly rebalanced between services, finance and manufacturing and technology and exporting."

As this month's "Catalyst for change" cover article highlights, major national infrastructure projects like HS2 very much hold the key to meeting this challenge and city leaders across the UK now understand this.

They understand that effective connectivity across the nation's major towns and cities, to and from the capital to link major interchanges and ports, is critical to attracting investment, stimulating growth, jobs and better lives.

Yet while there is no doubt that investment focus to create the desired "regional economic power houses" is vital, it is also clear that a modern, efficient and competitive capital city is critical.

It hasn't always been the case. For too long major infrastructure projects focused on or touching London were seen by the regions as simply London centric, self-serving projects driven by Westminster politics and the capital's big business.

The shift in thinking has been stark and prompted in no small measure by the on-going devolution agenda and local empowerment and engagement via Local Enterprise Partnerships and the promise of more regional mayors.

But as InfrastructureUK boss Geoffrey Spence pointed out at this month's ACE European CEO conference, devolution in itself will not boost growth or create jobs. It can act as an enabler but only with local leadership and engagement to embrace the opportunities that continued investment brings.

Local businesses must therefore continue to drive visions and embrace that investment opportunity if Cameron's vision is to be met.

Antony Oliver,
editor, Infrastructure Intelligence

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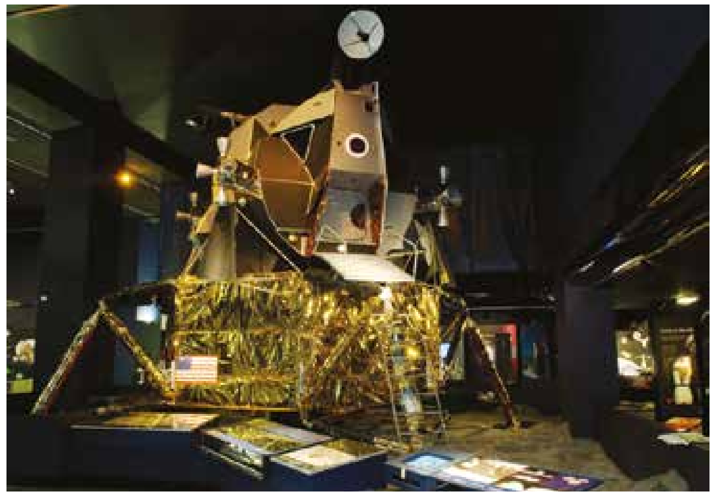
News roundup

ROADS

Prime Minister David Cameron put some flesh on the Government's promised £24bn of roads investment up 2021 in a speech to the CBI annual conference. He highlighted some of 100 schemes in the pipeline to upgrade Britain's road network, expected to be formally revealed in the Autumn Statement in December. Schemes include action to improve the A303 to the South West, A1 north of Newcastle to Scotland and the the A1 Newcastle-Gateshead western bypass, trans Pennine roads in the north, the A47 in the east of England and A27 on the south coast.

Twenty six consultants and contractors across four lots covering design and construction delivery have been signed up by the Highways Agency under its new Collaborative Delivery Framework. They will, said Agency chief executive Graham Dalton, be challenged to "look afresh" at the way work is delivered over the next five years to reduce cost and minimise impacts on drivers and communities. Faster, cheaper safer delivery is targeted.

Roads minister John Hayes has confirmed that the Office of Rail Regulation will be given an expanded remit to hold the Highways Agency to account once the roads organisation is given greater freedom from government. If the Highways Agency fails to honour the licence conditions that form part of its funding deal, the watchdog will have the power to take enforcement action, including issuing fines. In addition, Passenger Focus, which currently represents bus, coach and train passengers, will be expanded to reflect the views of road network users. The body will be renamed Transport Focus.



Engineering your future

How does the engineering brain work? On 17 December a new exhibition opens at the Science Museum, London, designed to persuade 11-15 year olds to become the engineers of tomorrow. 'Engineering your future' is about demonstrating to school children that they already possess key 'engineering habits of mind' – systems thinking, adaptation, problem-finding, creative problem solving, visualising and improving – and how these are applied to deliver engineering marvels as diverse as baggage handling systems, the Mars Rover, power supply networks and bionic hands. The exhibition will also tell the stories of women and men working in engineering today, showing that fascinating careers can be built 'making things that work, and making things work better'. Mott MacDonald is one of nine organisations supporting the exhibition. Keep an eye on Infrastructure Intelligence over the next four weeks to find out more about the exhibition and the workings of the engineering mind.

HOUSING

There is room for 630,000 new homes in London by building apartments above public buildings such as hospitals, schools and libraries, according to a report published by WSP. The report Building Our Way Out of a Crisis said there is the potential to provide all of the 488,000 homes needed in the next decade and provide upgraded public facilities for Londoners at the same time by capitalising on the 'air space' directly above the sites.

Pre-fabrication and off-site manufacturing is key to solving the world's growing affordable housing crisis, according to a new report by McKinsey Global Institute and McKinsey's Infrastructure Practice. In both the developed and developing world, boosting the efficiency of construction methods is crucial, the Affordable Housing Challenge report said. These need to work alongside other policy and financial levers to tackle the growing "affordability gap" that by 2025 will leave one third of the urban population unable to afford decent housing.

The Homes and Communities Agency has appointed a number of firms to its new £100 million multidisciplinary panel. The panel is: AECOM, AMEC Environment and Infrastructure UK, Atkins, BDP, CH2MHill, Hyder Consulting, Mott MacDonald, Mouchel, Ove Arup & Partners, Parsons Brinckerhoff, Pell Frischmann, Peter Brett Associates, Savills (UK), Tibbalds CampbelllReith Joint Venture, URS , WSP, WYG.

AIRPORTS

Cost of a new runway for the south east has been underestimated by all three options still up for assessment the latest report from the Airports Commission has said. Its latest consultation reports review in detail costs and impacts of a new runway at Gatwick, the Heathrow Hub extended runway option and a new north west runway at Heathrow. (See feature page 26.)

The Independent Transport Commission released its latest aviation report, Surface Connectivity: assessing the merits of the airports which called for a stronger focus on the surface transport implications of airport expansion, whether at Heathrow or Gatwick. "Expanding an airport without a clear plan for surface access will deliver only half the solution. No one simply flies: all airline journeys start-and-end with surface journeys to their final destination. But this issue has attracted far too little attention," it said.

BUSINESS

WSP plans a staged integration with Parsons Brinckerhoff following completion of its £820M deal to buy the consultant from Balfour Beatty. The combined business creates a firm of 31,000 employees across the world with combined annual net revenues of £2.3bn. WSP estimates that £15M of cost savings can be achieved within the first 24 months.

Political uncertainty means the UK is still some way off delivering the transformational upgrades the country needs according to the latest CBI/URS Infrastructure Survey. The survey of 443 senior business leaders showed that in key areas of competitiveness, like energy and transport, 67% and 57% of businesses respectively expect infrastructure to worsen in the next five years. 80% of firms said fears about future energy security were being factored into their investment decisions, while 74% say the same about fears of higher costs.

Government has moved to strengthen the impact of the Prompt Payment Code with the appointment of a new advisory board charged with highlighting poor and best payment practice. Skanska is the representative from the construction sector. The brief is to improve monitoring and enforcement of the code, promote awareness of the code and provide advice on whether there is a need to update it.

UK engineers are reporting surging confidence in economic recovery on the back of major investment in infrastructure projects according to a survey of 3500 professionals conducted by recruitment specialist Matchtech. 61% of engineers working in the UK's £1.06 trillion turnover engineering industry said they were confident the sector would see revenues increase in the coming 12 months.

Balfour Beatty's chief financial officer Duncan Magrath is to leave the business once a successor has been appointed. Chairman Steve Marshall is also on the way out when a replacement for him is found. New chief executive Leo Quinn starts on 1 January.

David Tonkin (pictured), Atkins UK and Europe chief executive is to step down as the business restructures to provide "a strong, technical-based capability" and increase sharing of "compatible skills across markets". Nick Roberts, currently strategy and growth director in the North American region, takes over from Tonkin on 1 December and will convert the existing six UK businesses into four larger, market-focused divisions including a new 3000 strong combined road, rail and transportation division. Atkins half year results this month revealed underlying operating profits had climbed 4.5% year on year to £53M despite revenues being impacted by the sale of its UK highways services business and by fluctuations in currency. Overall this meant that revenues for the six months to 30 September fell by £84M to £831.4M, reflecting, it said, the highways services business's £73.7M of revenue in the prior year, and adverse currency effects of £33.6M.

RAIL

The £1bn extension of the London Underground Northern Line to Nine Elms and Battersea has been given the go ahead by the government.

Management and programming is good; business cases and funding streams could be better, the National Audit Office has said of Department for Transport's delivery record. It concluded that the department had made progress in its management of rail infrastructure programmes and responded well on programmes such as Thameslink and Crossrail to managing risks and controlling costs.

The preferred route for Crossrail 2 has been set out by London Mayor Boris Johnson and plans will be submitted to Government for safeguarding for future development. The Mayor, along with Transport for London and Network Rail, are requesting safeguarding for the regional option for the railway which would link Cheshunt to the north of the capital with Epsom and Surbiton in the south.

ENERGY

The National Grid Winter Outlook 2014-2015, showed that despite recent unplanned power station outages the UK will be able to maintain power supply in the coming months. However it said that the reserve margin for electricity has fallen to 4.1% from 5% in 2013. (See feature page 12.)

FLOODING

Environment Agency has awarded CH2M HILL the delivery partner contract for the Thames Estuary Asset Management Programme. This major tidal flood defence programme, valued at £300M, represents the first 10 years of a 100 year programme developed by the Environment Agency to protect London and the Thames estuary from current and future tidal flooding through to 2100. CH2M HILL will be working alongside Balfour Beatty and specialist suppliers including Critigen, Hunton Engineering, KGAL and Qualter Hall.

Spending on flood protection in England is "insufficient" to maintain defences, the National Audit Office (NAO) has warned. It said half of the country's defences were being maintained to a "minimal level" and were likely to "deteriorate faster". The NAO also said spending on them had been cut in real terms between 2010/11 and 2014/15. But Defra hit back saying the NAO had compared spending in two financial years rather than the lifetime of the Parliament when investment had increased 5% in real terms.

Government has announced that sustainable drainage systems will finally go ahead in the spring, delivered through the planning application process. This means they will not automatically be to a high standard but this option is better than further delays, said industry experts.

LOW CARBON

Construction Minister Nick Boles urged the infrastructure delivery supply chain to "show leadership" and deliver a lower carbon, lower cost industry. Speaking at the Green Construction Board's Infrastructure Carbon Review One Year On conference, Boles, who also co-chairs the GCB, warned industry bosses that they had a duty to lead the way towards creating a "fairer, cleaner and more secure" future.

PEOPLE

Senior figures from the public sector and some of the UK's biggest firms have agreed to join forces with the Mayor of London on his new London Infrastructure Delivery Board to help deliver a major programme of investment in the capital's infrastructure over the next half century. Members include Network Rail chief executive Mark Carne, Thames Water CEO Martin Baggs and ACE CEO Nelson Ogunshakin.

Twenty percent more construction workers, totalling 600,000, will be needed to deliver the planned £96bn of projects in London and the South East during the next four years. A new report by London Chamber of Commerce and Industry and KPMG warns that training levels need to double to plug the gaps and predicts biting skills shortages by next April.

Transport was one of a number of industry sectors benefiting from the Department of Business, Innovation and Skills plans to develop Apprenticeship Standards under the Trailblazer scheme. Chaired by Keith Mitchell, chairman of Peter Brett Associates, two groups of employers will spend the next three months developing Apprenticeship Standards for Transport Planning Technicians and Passenger Transport Services / Operations / Operations Managers.

Antony Martin from Southwark has become the 500th trainee to emerge from the Thameslink Programme's London Bridge Skills Academy set up in 2013 to train and develop engineers working on the £6.5bn scheme.

HS2

Department for Transport is consulting on safeguarding the HS2 Phase Two route from Fradley to Crewe, Secretary of State Patrick McLoughlin has announced. He said: "The evidence so far indicates that routing HS2 to Manchester via Crewe would be the right strategic option. This is still to be confirmed, but undertaking this consultation will allow us to deliver our plans more quickly once a decision is made."

Even before HS2 phase two to the north has been confirmed, Government has given the go ahead for development of HS3 connecting east and west of northern Britain and cutting journey times between Leeds and Manchester in half. Government was responding to a new report by HS2 chairman Sir David Higgins following up his HS2 Plus document last March. Sir David's report 'Rebalancing Britain – from HS2 to a national transport strategy' sets out how Phase Two of the £50.1bn railway could be part of a much wider transport strategy to improve east-west connectivity in the north.

The construction and engineering supply chain was urged to "prepare for High Speed 2" and start forming integrated teams ahead of start of procurement in 2015 for the first London to Birmingham phase. HS2 chief executive Simon Kirby told delegates at supply chain conferences that the use of Early Contractor Involvement (ECI) contracts meant he was looking for contractor-led tier 1 design and construction consortia to form now, with stage 1 contracts let next year.

Scottish ministers have condemned plans to further develop the planned high-speed rail network in England with HS3 east-west across the north before a study to extend it to Scotland had been completed.

POLITICS

Greater Manchester is to have an elected mayor to preside over regional issues from 2017, George Osborne has announced. The move, agreed with leaders of the region's 10 councils, will mean the mayor will oversee policies such as transport.

INTERVIEW: Dervilla Mitchell joined the Arup board in May to become the most senior female professional in the business, yet she remains deeply engaged in global projects as a structural engineer.

What are the biggest challenges facing the firm right now?
As we emerge from the global recession, managing growth and delivering the right skills mix to projects around the globe will be a challenge. There is pressure to recruit new staff and integrate them into the organisation so they share our culture and values. In the project work I do, I have come to recognise that delivering technical skills and resources is not enough. It's also essential to get the right team mix and to develop relationships within teams.

You are Arup's most senior woman – in what ways are you a role model?
During my career I have carried out many different roles and I hope that others, whether they be men or women, will see that you can have a varied and interesting career in engineering. I have often been asked who my role models are and I believe we need to identify the characteristics of others which resonate with us and not seek a single role model to follow. Be yourself but learn from others.

How does someone in your position inspire the next generation?
They need to get an understanding of what engineering is about at the start of secondary school or earlier. Too many students give up maths and science subjects too early. I try to help in a practical way by attending schools careers evenings or giving talks to students. I am a supporter of Speakers for Schools and admire the work they do in connecting engineers with students.

Do you support quotas to encourage women into infrastructure ?
Arup doesn't have quotas but it has networks and structures in place which encourage a culture of diversity and inclusion. We operate in a traditionally male-orientated industry where less than 7% of engineering professionals are women, yet punch well above our weight – 28% of our technical staff are female. We want a work environment based on fairness, respect and merit, allowing talented people to succeed. We have ambitious targets for women in the firm and in leadership positions, and diversity is an item at each Board meeting.

What impact is this having?
We have seen an increase in women in leadership and management positions in the past year. Our female graduate intake is 35%, from an applicant pool of approximately 14%. In the past we had a low female apprentice recruitment rate – this year six of our 30 apprentices are female.

What keeps you excited by infrastructure?
Realising ideas and seeing them delivered is what excites me most about my job. I really enjoy working with architects and seeing the seeds of a project emerge from the creative process and I get huge satisfaction seeing a project delivered after what is often years of work. Things don't always come easily and therefore they are more satisfying when they finally materialise.

Sir Michael Bear, chairman, UK Trade & Investment's Regeneration Investment Organisation

Overseas investment is ready to drive regional regeneration across the UK

"RIO's approach has been to help investors find a credible pipeline of UK development opportunities that match their appetite"

UK Trade & Investment's Regeneration Investment Organisation (RIO) was formally announced by the British Prime Minister, David Cameron, on 11 November 2013 with the specific mandate of accelerating growth and jobs in the UK through foreign investment in urban regeneration projects.

Today, some 180 verified projects could offer an investor double digit returns – and across asset classes that span the length and breadth of the country. Project capital value is over £100bn with the potential to create 640,000 jobs and 90,000 residential units.

However, the UK's regen offer has been fragmented with project delays and uncertainty, making it difficult for investors to navigate their route to market. RIO's approach has been to help investors find a credible pipeline of UK opportunities that match their appetite.

It works to identify and iron out any bumps in the road such as ensuring the right support from key stakeholders such as Local Enterprise Partnerships and Local Authorities who might not understand how a foreign investor will approach a market like the UK – so finding an investor the right development partner is also a critical part to any successful journey.

Already 41 'shovel-ready' projects are attracting investor interest with the potential to create 170,000 sustainable jobs in politically ambitious areas such as Liverpool, Manchester, Birmingham, Leeds and Sheffield.

Projects that might resonate include Battersea Power Station and Manchester Airport City which offer a host of supply chain opportunities plus lesser known projects such as Edinburgh's Fountainbridge and Liverpool Waters.

We focus on investment from seven priority markets; Qatar, UAE, China, Singapore, Malaysia, US and Canada.

Intermediary contacts help access investors at the right level as does the government's diplomatic network – for example, hosting a ministerial-led event at an Ambassador's Residence in a key market can underline the government's support. In other markets, however, this approach is not so important where meetings are held directly with investors.

RIO's ambition is to deliver £3.5bn of investment wins next financial year.

As Prime Minister David Cameron said: "This will act as a one-stop-shop for our major inward investment opportunities – with £100bn of possible projects on the table… These projects won't just mean new jobs in London or the South East – but right across the whole country."

Paul Jackson, chief executive, EngineeringUK

Supporting schools to help drive engineering careers is a critical task

"My concern is that schools may not have the information they need to support the engineering ambitions of their students."

At this month's CBI conference there was again much cross political party talk about infrastructure investment.

While individual projects will be judged on their own merit, whatever size and scale, the industry needs skilled engineers to ensure successful delivery.

Our research shows that three quarters of parents would recommend a career in engineering to their children. Almost as many (73%) view engineering careers as desirable even though half admit they don't know a lot about what engineers do. When it comes to young people themselves, 47% would consider an engineering career.

So the good news is that generally, engineering rates pretty highly.

My concern is that schools may not have the information needed to support the ambitions of their students. While more than half of GCSE STEM teachers were asked for careers advice by their pupils last year, just 36% felt comfortable giving it.

Teachers play such an important part in the choices their students make, whether it's through moments of inspiration in the classroom or guidance about possible future careers. We need to do more to give them the tools they need to outline opportunities.

November was kicked off by the second annual Tomorrow's Engineers Week, which aims to change perceptions of engineering among young people, their parents and teachers. It is an opportunity to highlight the wide range of jobs available and to get young people excited about engineering activities.

We began at Shell, where Vince Cable reaffirmed commitment to investing in training future engineers and gave an update on progress since the Perkins review, highlighting the importance of a coordinated approach to schools engagement.

It was there too that Shell announced a £1M investment in the Tomorrow's Engineers programme, which will significantly increase schools outreach.

Shell UK Chairman, Erik Bonino, urged the wider engineering community to follow its lead and support the programme - last year it directly reached over 50,000 students in 1,200 schools.

This new investment from Shell and other employer commitments, including the secondment of a programme director from National Grid, will mean we can inspire even more young people.

Valerie Todd CBE, Crossrail talent and resources director

Investment in apprenticeships feeds the future

By 2019, Crossrail will be fully open and Londoners will be benefitting from one the most ambitious infrastructure projects undertaken in the UK.

From the outset we identified that there was a shortage of talent in the labour market. We wanted to do something to re-energise the skills base within tunnelling and underground construction, but in rail engineering and infrastructure generally.

The Tunnelling and Underground Construction Academy (TUCA) established by Crossrail in 2011 has been a huge success. This has supported employers looking for workers by providing pre-employment training, tunnel safety training, apprenticeships and advice to those seeking work.

Approximately 7,000 people have received some form of training at TUCA.

New tunnelling specific apprenticeships have been developed by Crossrail specifically for the project while existing apprenticeships include business administration, procurement and accounting. Apprentices receive both training in a college environment and hands on in the workplace, and are employed by Crossrail, or one of the programme's partners and contractors.

In partnership with principal contractors we have delivered the most significant injection of new skills into UK tunnelling and underground construction in a generation.

Our recruitment approach is helping provide a new direction for the sector and could be replicated across other sectors of the economy to help address the large number of young people not in employment.

Around two in five Crossrail apprenticeships have been filled by people that were not in work, almost double the UK wide average.

We are targeting unemployed people, providing pre-employment training and making sure that jobs are advertised externally through the National Apprenticeship Service and other routes rather than relying on word of mouth.

With one in seven young people unemployed in the UK and only around 15% of employers employing apprentices, there is significant opportunity for other sectors.

Engineering offers a huge range of career opportunities. The demand for engineering roles is increasing. Following Crossrail there will be Thames Tideway, the Northern line extension to Battersea, HS2 and Crossrail 2 which will all require a skilled workforce as will the next generation of nuclear power stations.

Eduardo Niebles, MD, international business, BST Global

Why IT remains a critical factor in merger and acquisition success

"Performing proper due diligence in the area of IT can help identify risks and opportunities regarding compatibility and integration challenges."

In January 2014, AMEC announced the acquisition of Foster Wheeler. Two months later, Cardno announced its acquisition of PPI. Then in July, AECOM announced is was to buy URS Corporation. And most recently, Arcadis completed the purchase of Hyder.

This uptick in mergers and acquisitions is fuelled by a number of factors, including client demands for greater scope of services, shifts in global market dynamics and emerging country-specific markets in Latin America, Africa, and the Middle East.

There are many post-merger considerations to address, including technology business management systems.

While many firms speak of synergies from M&A activities, this concept is not often emphasised around business systems until after – usually, long after – the deal is done. But with a single business management solution and technology strategy, creating one dynamic organisation from two or more can be rapidly realised.

One criterion for success in any type of merger is when the entire organisation creates business processes supported by an integrated business management solution platform.

Engineerint consultancy firms typically have three options:

1. Bring together the companies and integrate the IT platforms.
2. Select one of the business processes and integrate gradually.
3. Do nothing and let each company operate individually.

Performing proper due diligence can identify risks and opportunities. The risks could be, for example, instability issues that will need to be addressed quickly, once the deal has been done.

Opportunities include cost reductions, resource utilisation in new areas, and the identification of processes that can be supported through IT to ensure synergies are achieved.

Key is to form an integration team early with knowledge and experience of the business processes and an understanding of the future objectives.

Once the deal is done a blue print for IT integration needs to be developed. This is critical as emotions run high and focus needs to be on the final product.

The final execution phase is about enabling business processes and technology integration, and handling change management challenges when blending company cultures.

Rob Pannell, managing director, Zero Carbon Hub

Overheating homes pose an increasing threat to life as climate changes

As buildings become more 'airtight', there is concern that occupants will be more at risk of overheating. This can have consequences for health and in extreme cases can be a threat to life.

The 2003 summer heatwave across Europe is thought to have caused more than 35,000 deaths, including over 2,000 in the UK. Although problems associated with winter weather are more frequent, average temperatures are set to rise and more such hot spells are anticipated.

Those most vulnerable, such as the elderly or sick, are more likely to occupy homes during daytime, when the heat is most intense. They will also suffer from heat disrupting their sleep at night.

The challenge for both the new build and retrofit sectors going forward is to consistently provide energy efficient homes which stay comfortable throughout the year and control both external and internal heat gain.

External heat from sun shining through windows and from heat moving through the building fabric can heat interior surfaces and air. While a positive contribution in the cold winter months, it may be unwelcome if not controlled in the warmer months.

New houses and retrofitted building stock, if inadequately ventilated, tend to retain this heat, allowing it to build up.

Internal gains can also vary depending on the type or age of the home, how airtight and insulated, and the type of hot water systems, lighting and appliances used.

In addition the location, construction type and layout of the home can also be a factor. For example, in cities the presence of the 'heat island effect' – where air temperatures can remain high even night – can make purging hot air particularly problematic.

There are also a number of practical challenges around overheating. These include planning such as whether permission can be agreed for measures affecting the outward appearance of buildings, plus the behaviour of occupants themselves – in particular, how they use the ventilation and shading systems.

Zero Carbon Hub's new project will evaluate options for supporting and incentivising action to tackle this problem, ranging from improving tools and guidance, through to mandatory legal standards.

It is critical that government, the house building industry and those involved in managing existing homes engage in the project to ensure our proposals are both practical and commercially viable.

Graham Reid, chief executive, Hyder

The challenge of driving and maintaining skills in the industry

Driving and maintaining skills in our industry is a complex matter. I liken it to the chicken and egg theory – do the projects drive the skill requirements or do the experts with the skills drive the solutions to our clients' projects?

Ultimately, the best talent, no matter what industry, will seek out the opportunities to be involved in work that is engaging, challenging, motivating and rewarding.

So how do we ensure we win the innovative and cutting edge projects that retain star talent and key skills?

In my view it's simple – by listening to our clients. It's the tried and tested way to gain understanding of their strategy, business drivers and objectives. Armed with this knowledge, we can anticipate their needs and adapt our approach – whether that is developing capabilities in growth areas, aligning regional business units to the client's structure or upskilling to deliver with new software. Excellence is defined by the client, so we must be agile.

I believe it's also cultural. In today's market, we can't stand still. To be successful we need to be one step ahead of yesterday. As consultants, we have to evolve in line with our clients, rather than shoehorn our ideas and ways of working onto them. I've always been one to challenge the status quo, take things to the 'stretch' level and do everything that little bit better the next time. Embedding this culture into your business can be a powerful source of competitive advantage.

Creating the opportunity for people to develop by investing in training is another obvious driver.

Another emerging trend that I believe has equal developmental value is co-locating. Working side by side in the same location with the client, the contractor and other delivery partners creates an environment in which people can share and build upon ideas.

It's becoming an increasingly logical approach to take, especially in joint venture projects. When we collaborate more, we build trust, and if you get that right, it will inherently deliver more value, drive out waste and develop an overall more effective experience.

Everyone wants to be on the winning team. Our role as business leaders is to create the environment in which those with the skills we seek can see themselves aligned with us for the long term. That is our challenge.

Martin Powell, head of urban development, Siemens

Smart cities of the future will change the way we live our lives

A new book "Better Cities, Better Now" addresses how cities across the world are tackling 21st century megatrends and the challenges of sustainable urban growth.

Better Cities, Better Now will be launched in the Crystal in London on Tuesday, 9 December www.siemens-events.co.uk/crystal/booklaunch2014

Cities are at the heart of digitalization. They are powerhouses attracting the brightest minds, and with that are the most capable of adapting to change.

As society begins to grasp the finality of our planet's resources, there is a pressing need for cities to become more efficient at managing energy use, resources, mobility and innovation. Already, the world's leading cities are employing high-tech solutions to become more efficient; however, advancements in greener devices alone will not enable a city to be a better place to live.

A smart city has the ability to access big data that is supplied by high-tech devices; to extract knowledge and most important – to interconnect every "component" of the city, human and machine, and to drive innovation.

In 2008 the number of devices connected to the internet had exceeded the population of our planet, and has exponentially increased ever since. Huge volumes of data has filled our world, bringing with it countless opportunities. The potential for a better city comes from the way we manage this data.

Intelligent analysis of data can enable society to make informed decisions, whether it is about the way we live our lives now or planning future projects.

Now urban decision makers can use smart concepts and tools to select technologies that offer maximum environmental and economic benefits.

The challenge is understanding the impacts of different technologies on priorities such as air quality, climate change and job creation. How does one technology compare with another? Which brings the greatest dividend and which is the most cost effective? Combining good quality city data with technology data enables us to find answers to these questions.

The City Performance Tool allows cities to explore 70 technology levers across transport, buildings and energy technology. Using knowledge of how these technologies perform in cities it enables detailed insight into the CO_2, air quality and job creation.
Such tools empower city managers to focus on appropriate technologies that provide win-win solutions in the key city areas: buildings, transport and energy.

The battle for tackling climate change will be won or lost in our cities. Through human history cities have overcome many challenges and evolved through innovation. The path to a sustainable future requires strong leadership, innovative technology and a step change in the pace of deployment that only cities can make happen.

Chris Fry, director, Temple Group

Compounding the benefits of infrastructure

The Environment Hub

Infrastructure Intelligence is working with Temple Group to deliver the new digitally based Environmental Hub as a key part of www.infrastructure-intelligence.com.

Visit the new hub to find analysis, thought leading viewpoints and articles on the critial environmental issues facing infrastructure professionals.

I recall a rower friend describing his coach's successful approach to motivating his squad to attaining higher levels of performance.

Expecting the post-race team talk to pinpoint precisely what was needed to optimise the complex dynamic of power, technique and equipment, he instead said just four words: "next stroke, row better".

Small improvement every time added up to a big difference. It is probably equally simple for new infrastructure projects to take the same approach.

So what is stopping us simply making each project better than the last?

One thing might be that budget and time constraints often lead people to be safe and take a painting-by-numbers approach to conceiving, planning and designing projects. This can result in a lack of early thinking about the big issues for the project in hand.

Another highly damaging trait is the "not invented/appropriate here" response. Such thinking leaves the best engineering and environmental solutions missed. In a global market where new ideas are being exchanged instantaneously, these traits impact the UK's competitiveness abroad as well as missing opportunities at home.

The overall purpose of infrastructure is to improve people's quality of life. Focusing on how it improves the environmental conditions and works for communities helps project teams to remember that infrastructure is a means, not an end in itself.

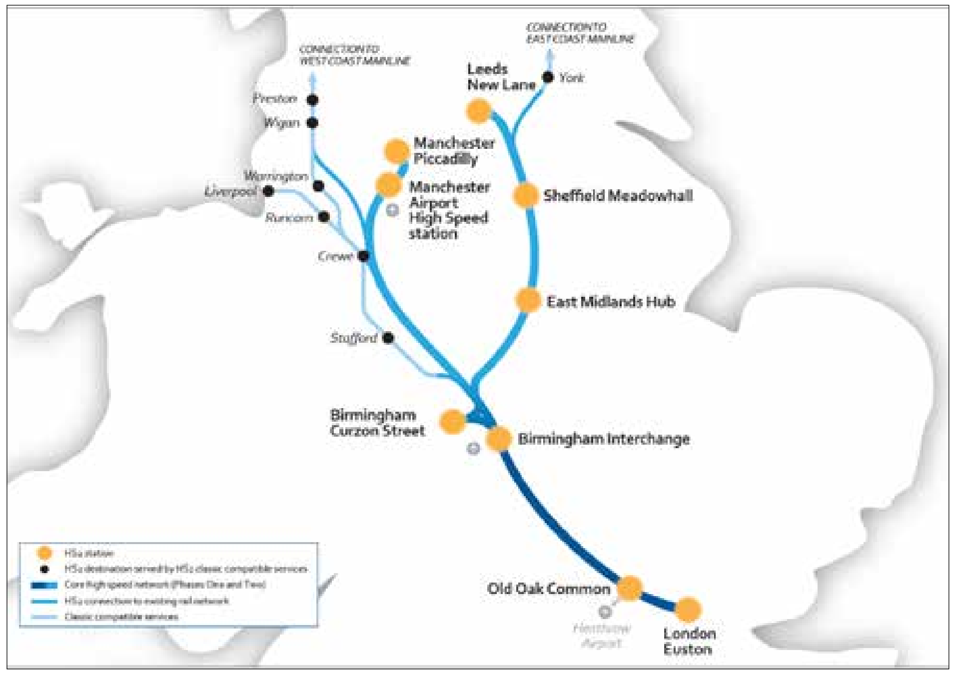
In turn, this broader appreciation can deliver value by leveraging opportunities from other aspirations. For example achieving lower cost, higher performing habitat compensation or flood risk attenuation by looking beyond the immediate project boundaries.

Not every project has the scope to innovate like the Olympic Park or make big step changes in technological innovation but incremental improvements that compound the benefits are within reach for every project. My hunch is that the teams that achieve most and deliver the highest value infrastructure will have conscious early thinking and will be open to beg and borrow good ideas from elsewhere.

Remember Pablo Picasso's view: "good artists borrow, great artists steal" and don't be afraid to adapt the best ideas from wherever you can get them.

Regeneration opportunity

Across the world, investment in high speed rail projects is now seen as a proven catalyst for urban and regional regeneration. Antony Oliver spoke to HS2 commercial director *Beth West* about how the UK will follow suit.



Beth West, commercial director, HS2 Ltd

Six months from a General Election it is rare that UK politicians agree across party lines. Yet when it comes to the crucial need to invest in a high speed rail network, all remain resolutely behind the £50bn plans.

The Independent Transport Commission's latest report "Ambitions and opportunities: Understanding the spatial effects of high speed rail" published in November, will have therefore made welcome reading.

The report from ITC makes a compelling case, based on research into schemes in France, Belgium and the Netherlands, that high speed rail can not only help boost the UK's transport capacity but also act as a major catalyst for economic regeneration of the country's cities and regions.

The critical factor in ensuring that maximum benefits flow from this investment catalyst, according to HS2 commercial director Beth West, is first having a vision for what the city or region needs and then having leaders capable of delivering that vision.

"The reason I got into infrastructure is that it is the backbone of letting businesses do what they do - they cannot be entrepreneurial unless there is good infrastructure," she explains. "But our research has seen what has happened internationally and you have to plan. You can't just hope that something is going to come along organically."

Without question there has been a huge shift across the UK regions to whole-heartedly embrace the regeneration benefits of the project as it moves across the nation from London to Leeds and Manchester via Birmingham.

"The tipping point, I think, was last year when Ed Balls made his comments about the project at the Labour Party conference," says West. "That is when northern cities leaders said "hold on – actually we want this". It was that threat of not having it that made them take action. The landscape is now totally different."

Lord Deighton's Growth Task Force made a big difference, she says, not least as he posed the question as "how can we get more out of HS2?" rather than just asking whether it was a good thing.

The David Higgins reports that followed talked about connectivity and pointed out unambiguously that regeneration and transport go hand in hand. All of which built support and gave a boost to confidence compared to the project's early days.

Two years ago HS2's regeneration strategy was built around the so-called "plug in station" concept, a radical idea to prepare and kick start development zones around HS2's new station sites in advance of the railway's arrival.

To a certain extent this strategy still exists but, explains West, it is now far more couched in reality.

"Ideally we would still like to have the regeneration start happening before the station is built," West says. "But a lot comes down to getting good masterplan in each location and to local authorities knowing what they want and being able to define that."

There has, she says, been a great effort across government to think about how to help to make this happen and, she says, one of the big changes with HS2 today is the acceptance that it must engage with the regions and communities beyond the railway and station footprint.

"It is not just railway engineers with their head down building railway. It is recognising the context and what it means for the area," she explains.

"You cannot just plonk something that works in London, into Birmingham or Manchester – you have to make it work from where you are," West adds. "Birmingham, for example, has done a really good job changing its masterplan to reflect what has been going on with thinking around Curzon Street station and it now absorbs the station more effectively into the region's masterplan."

The reality is that one size does not fit all across the UK. What works to drive regeneration in Euston will almost certainly not work in Sheffield.

That means working closely with local leaders – be they from the local authorities or from local enterprise partnerships or other stakeholders – to really understand how to get good outcomes and, of course, to ensure that everyone agrees what is meant by a good outcome.

From this perspective the post Scottish referendum rush towards increased devolution of power to the regions should, says West, potentially assist by driving local involvement and decision making.

"The further that you are from it the harder it is to see what the issues are," she explain. "You have to create [projects] of manageable size so that it is possible to see success. One of the benefits of devolution is that by bringing it to a local level it should be more manageable and so be achievable."

Manchester, she points out, is a great example of how to make things happen.

"Where Manchester gets its success is that it has a clear view of what it is trying to achieve and then is able to take people with it," West explains. "Success comes from local authorities defining a vision around what they want then working with us, with the government and the private sector to bring in investment to start building."

She adds: "It has to come from the local communities. Asking "what do you want?" and then having flexibility in designs so that they can evolve. Because things do evolve."

Unpacking the policies for successful local growth

The What Works Centre (WWC) for Local Economic Growth is based at the London School of Economics and is working to identify which government policies are most effective in supporting and increasing local economic growth

As government is faced with slower growth and tighter budgets, and local decision makers take on new powers and freedoms for economic development, careful research and evaluation has a crucial role to play in increasing the effectiveness of policymaking.

As the WWC points out, the critical question when it comes to supporting local economic growth is identifying which policies are most effective.

The multidiscipline team from LSE, Arup and the Centre for Cities is working to support the authoring of new reports.

Joanna Rowelle is an economist who works for Arup but is seconded to the WWC. Rowelle's previous experience is in policy and delivery when she worked for the Mayor of London in economic policy and regeneration for eight years.

This means, she says, she appreciates the tricky balance of providing evidence based outcomes while also enabling the public sector to actually use the recommendations.

Interview by Antony Oliver

What would you say are the critical policies that support local economic growth?

One of the strongest findings so far is that the lack of quality evidence and evaluation available surrounding important and very costly policy initiatives means it can be difficult to draw conclusions about their success.

Projects like HS2 are seen as major drivers for regional growth. What does history/research tell us about factors that make them more likely to succeed?

The evidence would suggest that to capture the wider benefits of any such major infrastructure investment, local interconnected transport and other investment is needed to spread effects beyond the immediate environs of stations or sites. The WWC is about to start work looking at local transport policies so more findings will follow.

Joanne Rowelle, associate director, Arup

How do successful regions organise themselves to maximise growth?

By understanding their strongest assets and working to improve those areas which are struggling. But regions should not simply "pick winners" as you could end up creating a bigger gap between your successes and failures. We have seen places which have been predicated on one industry, employer or sector, just fall apart when that industry has walked away. Therefore, with the advances in new sectors and our ever globalised world, those regions performing well are either harnessing their strengths in multiple sectors across the skills range, or supporting their strong employment base and looking ahead at what they need to do next.

Do some policies work better in different regions?

The WWC is currently only looking at 'what works' but of course the interesting debate is also what works where. Regions all have their unique qualities and then there will be shared issues and opportunities so I anticipate that some regions will have policies that work better than others. It is about understanding the conditions of what works in a place as well as the financial and policy levers available, and therefore not simply a blanket approach.

To what extent is supporting and increasing local economic growth also to do with local personalities?

Good question – and with my Arup hat on, I'd suggest that those projects which succeed are those which have a naturally strong leader or ambassador – not necessarily political. This doesn't have to amount to one individual but can be a collective of people or organisations. You cannot separate economics and funding from governance or from consultation or from commercial investment. It is a suite of things which are knitted together and which can then create good outcomes for local economies.

What have you found are the typical blockers to effectively rolling out these policies?
There isn't one common theme, which in itself is perhaps an interesting finding!

Driving development ahead of the infrastructure is now seen as critical – does it depend on the region?
I advocate that we don't talk about projects in silo but rather we talk about whole place solutions, development and infrastructure, which all go hand in hand. This is why I think we are now aware more than ever that 'build it and they will come' does not necessarily work, especially outside London.

We have seen the re-emergence of regional power centres – what is driving this?
Elected Mayors are great for cities as we have seen in London and global cities including New York. I am in Sydney this week where part of the debate has been about the role of a regional government driving the interests of a city. The skill is to make sure that the regional role plays well in the national agenda and is adaptable and agile – a regional centre needs to keep looking around itself to see what is happening in the rest of the country..

How can the regions raise their skills levels to embrace the growth opportunities?
Major infrastructure development takes place over decades so I really struggle with why the skills debate always seemingly starts from the 16+ age group. I would love to see education and skills brought together with other policies and budgets so that we see how we can effect change for a whole generation but it all seems a bit piecemeal at the moment. I think we need a stronger thread running through from the very start of education.

Are there international examples of success?
This is a broad question as it depends how we wish to measure success. The places that have been proactive to the opportunity that high speed rail has presented them, by integrating their local transport connections early and getting development ready, have delivered higher levels of economic growth and productivity than those places who took a 'do nothing' approach. The areas that thought the introduction of the railway will be enough have seen little or no growth as a result.

Driving growth through investment in connectivity

Simon Kirby, chief executive, HS2 Ltd

"We are determined to use this once-in-generation chance to create life-changing opportunities."

Britain has a two-speed economy. The differences between the North and the South are stark. The North lacks connectivity and productivity. The South has over-crowded transport and an over-heated property market.

Overall, the result is the country is not fulfilling its economic potential.

So we need to bring people together in a more equitable and fair way. Perceived proximity, reliability and easy access all increase trade. Improving connectivity is an essential part of raising productivity and prosperity across the country.

These are the reasons why Britain needs high-speed rail.

HS2 wants to begin delivering transformational change for the country long before the trains start running in 2026. Our ambition is to do so at every stage of the project – during the planning and construction of HS2 as well as the operations.

The planning phase of HS2 has brought attention and energy to the complex, long-term issues that lie underneath transport planning. Consequently, people across the country are talking about how to stimulate their local and regional economies – and the role of transport in this.

Cities, regional organisations and businesses can contribute to and benefit from the discussions created by HS2's planning stage, including proposals for:

- improving east-west connectivity
- a National Transport Strategy – as recommended by HS2's Chairman, David Higgins, in his second report, "Rebalancing Britain"
- Transport for the North – to enable the North to speak with One Voice on transport as London already does
- Lord Deighton's Growth Taskforce Report – recommendations on how to extract every penny of value from HS2.
- One North Report from Leeds, Liverpool, Manchester, Newcastle and Sheffield on how they can use transport to create thriving, interconnected cities and towns which will deliver growth for the region and help rebalance the economy.

HS2 Ltd will work directly with around 15 large Tier 1 organisations to build the infrastructure. But around 60% of supply chain opportunities are expected to be awarded to SMEs from across the whole country and from many sectors.

Building HS2 will create nearly 25,000 construction jobs, including approximately 2,000 apprentices. We are determined to use this once-in-generation chance to benefit as many people as possible, to create life-changing opportunities for local and under-represented people and businesses.

The people and organisations who build HS2 will develop skills, processes and products that give a competitive edge globally in high-tech rail, infrastructure and manufacturing. HS2 Ltd will support this through its education outreach programme in schools, apprenticeship programme and the National College for High-speed Rail.

When HS2 begins operations in 2026, it will provide better connections for over 100 UK cities and towns, including eight of the largest cities.

Phase One will shrink journey times between London and Birmingham from 81 to 49 minutes. Phase Two will unlock the North-West and North-East by substantially cutting travel times along its Y-shaped network.

Local and regional markets will open up and attract foreign investors. Businesses will change their investment and location decisions.

Knowledge-sharing and innovation will become easier and faster and, over time, the connected cities will increasingly be able to work, trade and compete as one economic powerhouse.

Winter preparation

The lights will stay on through the darkest season of the year, says *Cordi O'Hara*, director of market operations for National Grid.

As the nights draw in and the temperature begins to drop, we enter the time of year when households and businesses make their final preparations for winter. At National Grid we're no different.

Following consultation with industry, experts and policymakers in the world of gas and power, as well as our own analysis, we published our 2014/15 Winter Outlook on 28 October. The Outlook looks at a range of scenarios for the gas and electricity supply picture for the winter and is designed to help the energy industry plan ahead. Our stakeholders value its usefulness, and use it to inform tough business decisions.

It is part of our role as the system operator for electricity – and the transmission owner and operator for gas – to provide this kind of insight and intelligence. We don't build or operate power stations, ship gas, or set policy, but our information and data helps those who do.

So, what are the key headlines from our Outlook? On gas, the country is in a strong position this winter, with gas supplies, storage and network capacity well in excess of maximum expected demand. This year we felt it prudent to look at the potential impact of an escalation of hostilities between Russia and Ukraine. The Outlook shows that only under cold winter conditions and full disruption of Russian gas to Europe would further market actions be required; for example; reduced exports to the continent, demand-side reduction or maximised liquefied natural gas (LNG) imports.

It is the electricity picture which has, predictably, brought about the lion's share of the headlines this year. Margins are tighter than in recent winters, due to closures, fires, boiler cracks at a nuclear station, and the delayed return of some plant from outage. This means that the margin during an average cold spell sits at 4.1%. That doesn't mean we'll always have only a four per cent cushion between available supply and demand. This figure is a snapshot of how things could look during an evening peak in demand, over the kind of cold spell we could realistically expect to see.

"Only under cold winter conditions and full disruption of Russian gas to Europe would further market actions be required"

Cordi O'Hara

At National Grid we have dealt with tighter margins than this before, but for this winter we have developed two further additions to our toolkit, with the blessing of Ofgem, and government ministers.

In September we acted to tender for additional generation under the Supplemental Balancing Reserve (SBR). This service is targeted at power stations that are able to offer additional capacity over and above that available in the electricity or balancing markets – this means plant that would otherwise be closed or mothballed, or at risk from closure. Plant taking part will be required to be available on weekdays between six in the morning and eight o'clock at night, from the beginning of November to the end of February. We have finalised contracts with RWE, Scottish Power and SSE over Littlebrook, Rye House and Peterhead power stations respectively.

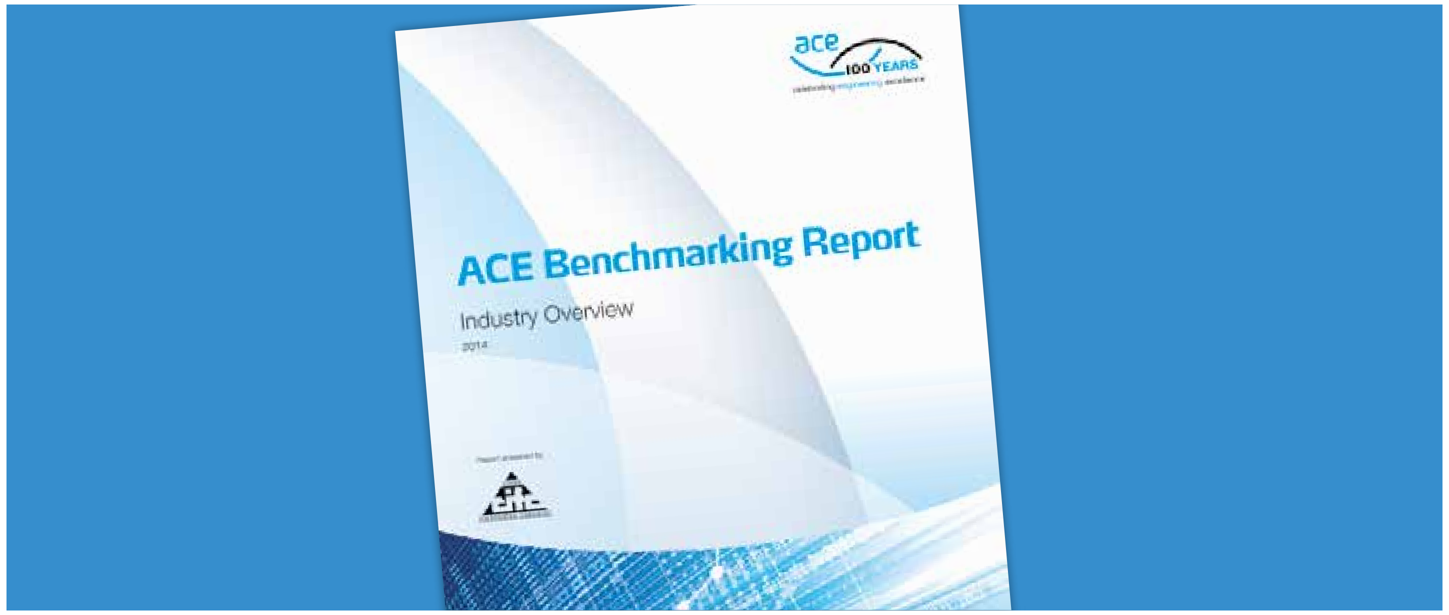
It's also crucial to find innovative ways to smooth out peaks in demand, and that's where our Demand Side Balancing Reserve (DSBR) comes in. DSBR is a voluntary scheme where large energy users can be rewarded for reducing the pressure they put on the system at peak times. Big companies have already signed up this winter, like Tata Steel. And there are hundreds of other smaller companies who are taking part through aggregators like Flexitricity. It's the first year we have run this scheme, so we're delighted that we've got 431 sites on board this winter. We've already started tendering for next year, when we're hoping for an even bigger response. Demand side response is a great opportunity for companies of all sizes, so I'd encourage energy managers to get in touch with us to see how they can get involved.

This winter the two new tools I have outlined will add a further 1.1GW of additional capacity to the system. These tools push the electricity margin figure for winter 2014/15 up from 4.1% to 6.1%.

These are last resort measures, and we may not even need to use them, but they are a sensible insurance policy to have in place. These tools are not expected to be around forever. The Government's electricity market reform programme is designed to stimulate major investment in new power stations in the second half of this decade. This includes a capacity mechanism, which will run from 2018/19. This will give generators and their investors the certainty they need to put in place reliable capacity, backed by a predictable revenue stream and committing them to ensure generation is available when electricity supply is squeezed.

Over any winter we know that there are always things we can't predict, so we cannot be complacent. Things can happen beyond our control that could affect the electricity network, but by taking the additional measures we have, I believe that we are in a strong position to manage the unexpected.

ACE Benchmarking: Late payments are adding to costs



Late payments continues to be an issue, but information is scarce. Time to look at some numbers from the latest ACE Benchmarking report, says ACE chief executive *Nelson Ogunshakin*.

ACE through Infrastructure Intelligence, other media and groups has long campaigned and supported industry in trying to address the issue of late payments. Late payments are economically inefficient and can have a significant effect on cash flow and the viability of a business.

Changing such behaviour, however, is difficult and data surrounding the exact nature of the problem scarce. For this reason two years ago ACE introduced a comprehensive set of questions regarding late payment within its benchmarking exercise, from which I am are now happy to report the findings.

Let's start by looking simply at companies' debtor days. It was revealed that for SME participants these were on average equivalent to 81.5 days' sales; larger UK companies carry a similar level of debtors, equivalent to 79.5 days' sales. Such numbers are significantly in excess of the 30 day target.

"The sample data revealed that a quarter of UK companies received 50% or more of their revenue outside the contract terms."

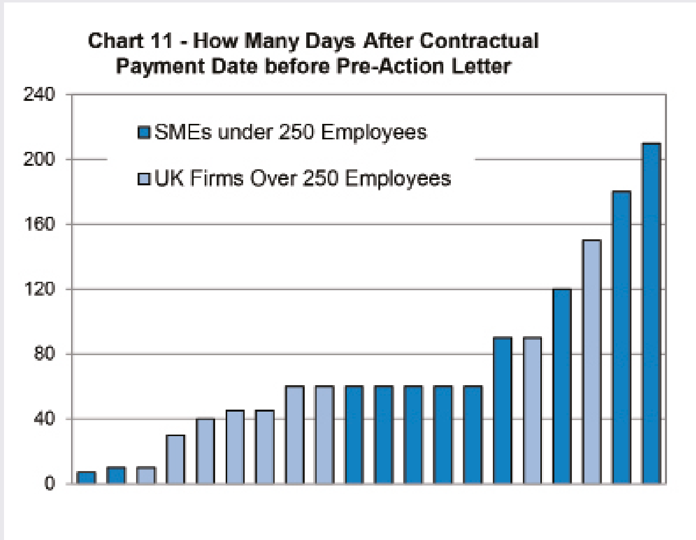
Nelson Ogunshakin

The numbers above, however, do not differentiate between private and public sector debtors. Whilst not all companies could provide data, when this is accounted for it is revealed that private sector clients take 10 days longer to arrange payment than the public sector.

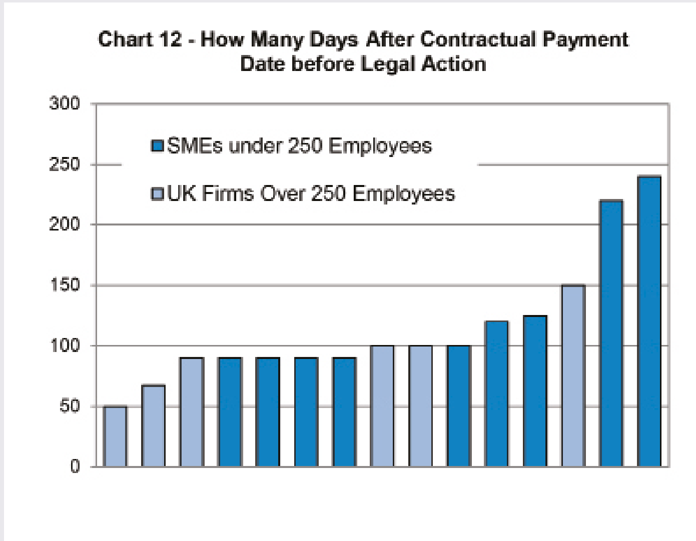
The question is, how widespread is the practice of late payments? The sample data revealed that a quarter of UK companies received 50% or more of their revenue outside the contract terms.

Such a significant amount of payments being outside contracts have knock-on effects for company time and costs. The data received revealed that SME firms' directors/partners spend 4.6% of their time settling late payment disputes. For large firms the time spent was 5.1%.

Looking beyond directors/partners, large firms' other staff spent 5% of their time trying to settle late payment disputes whilst other SME staff spent 8.4% of their time undertaking these duties. This demonstrates the significant time that can be spent on such activity and why efforts to improve payment times would bear savings not only for companies but also for clients.



It can take over 200 days for firms to seriously pursue money owed.



Companies were asked to indicate how long after the contractual due date they would send a pre-action letter. Answers ranged from 7 days to 210 days. This is obviously a significant range and will affect a company's ability to settle disputes.

It was clear from the data that larger UK firms typically are more prompt in sending out a pre-action letter. The median for large companies was 45 days but 60 days for the benchmarking SME firms. Some companies, however, did report waiting over 100 days past the due date before action was taken which seems to be excessively lenient.

Looking beyond a pre-action letter, large companies reported that legal action would be undertaken after 95 days, with SMEs indicating a similar figure of 100 days.

The figures above make for worrying reading, and show that action is needed to try and address the issue of late payments. The collation of the data above is only the start, ACE intends to continue to develop and extend the companies in this sample to improve the wider understanding of the issue. To help ACE achieve this I urge companies to take part.

There is, however, a much larger picture to be aware of. Payments form a part of a much wider procurement process which is in need of greater understanding by all parties.

Change needs to occur on multiple fronts across the short medium and long term. Cultural change will always be a long process, and where industry can make short term improvements these should definitely be sought. The problem, however, is much greater than simple contract terms.

ACE will therefore continue to engage with all parties from government, clients and companies all the way down to the very bottom of the supply chain to help move the debate forward with the aim of improving conditions for industry and clients.

What's the earnings story?

Has revenue increased in the last year? And if so, was it more profitable? ACE senior economist *Graham Pontin* reports.

Has industry performance picked up over the past 12 months? How do SMEs compare to large companies? How does the UK compare to Europe?

Of the companies involved 20 of the 25 large firms increased their revenue in the latest year and 17 of the 20 SMEs also saw their revenue increase. Following a number of challenging years such news will be seen as a positive step forward for the industry and finally may represent a return towards more historical levels of output.

Interestingly the 2014 report reveals that whilst in the previous year mega firms with higher revenue growth and turnover enjoyed faster growth, the opposite is true in 2014. This suggests the firms above SME level but below the mega consultants have started playing catch-up.

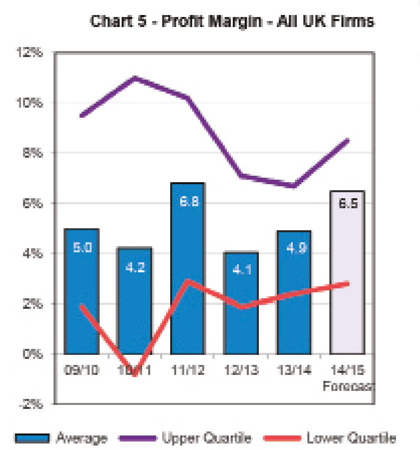
Impressively on an annual 12 month rolling average basis, large UK firms on average achieved an 11% increase in revenue in Q2 2014, which was significantly above the 2.3% being achieved by European equivalents. SMEs performed even better than their large UK counterparts achieving growth of 17.2%.

"SMEs performed even better than their large UK counterparts achieving growth of 17.2%."

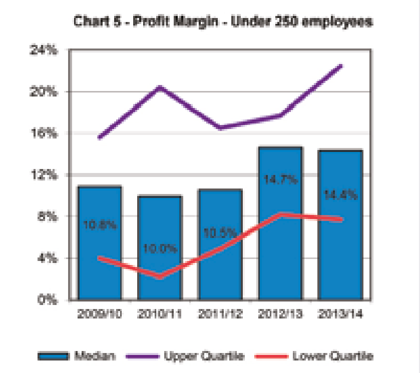
Graham Pontin

Revenue alone, however, is not the only issue industry has faced. Tight profit margins have also been identified as an issue.

Looking at this year's findings it is revealed that the average Larger UK profit margin improved from 4.1% to 4.9%. In 2013, UK firms were originally forecasting a bigger improvement in average profit margin, but although revenue targets were generally achieved, Large firms



SME firms



costs rose faster than anticipated.

The European firms average profit margin fell from 6.8% to 6.3% in the latest report, compared to last year's forecast of a 0.8% point rise in profit margin. Unlike the UK where cost rises were the significant factor in undershooting profit margin, for EU firms forecasts were more typically missed due to overestimating revenue growth.

If we compare this to SMEs, the average profit margin for the companies fell slightly from 14.7% to 14.4% in the 2014 report.

Key findings

- In the 2014 report average overall profit margins improved for UK firms to 4.9% (previously 4.1%) whereas it declined for EU firms to 6.3% (previously 6.8%).
- Companies overall are forecasting a profit margin improvement of 1.1 percentage points next year.
- SME firms achieved an average profit margin 9.0 percentage points higher than large firms.
- Average year end debtors days for EU firms was equivalent to 100 days which was higher than that of larger UK firms at 80 days and SME firms at 82 days.
- Fee earners' staff costs accounted for 62% of revenue in UK large firms, for SMEs the percentage was 57% and for European firms it was 59%.
- On average UK companies spent 4.8% of directors/partners time settling late payment disputes.
- On average large firms generate £1.45 of revenue per £ of staff cost, whereas SMEs generated £1.58.
- Professional indemnity insurance costs for larger companies on average are 1.3% of their revenue or £800 per fee earner. SMEs paid 2.2% or £1,500 per fee earner.

Payroll costs on the rise

Controlling costs has been important for companies in the last few years, but salary pressures are starting to emerge.

Larger UK, EU and SME results
Table 2 – Average Payroll Cost per Employee

	UK Firms		European Firms		SMEs
	£	£	£	£	£
	2012/13	2013/14	2012	2013	2013/14
Engineers (2-5 year's experience)	38,900	40,700	52,400	51,900	40,450
Average – All Fee Earners	51,00	51,500	55,800	53,300	42,600
Support Staff	38,500	34,600	57,400	50,500	28,800
Average – All Employees	50,500	49,700	56,000	53,600	39,600

For a full breakdown by all staff bands go to www.acenet.co.uk/benchmarkingreport

Whilst salary growth continues to struggle to pass inflation, pressure is mounting as employees that have undergone years of real reductions in income are starting to demand real pay increases. With the number of fee earning staff leaving voluntarily at a five year high, pressure will only continue to increase, especially in areas where skill shortages exist.

The 2014 benchmarking survey shows that some of these pressures are emerging. There was a significant increase in headcount (+7.6%) during the year with the biggest increases amongst engineers (2-5 years' experience) and Juniors and Graduates, with the average costs for Engineers (2-5 years' experience) and Senior Technicians increasing by 4%-5%.

The average payroll cost per fee earner for large UK companies was 0.8% higher than the previous year at £51,500. On a constant sample basis, however, costs per head were 2.8% higher in 2013/14.

For SMEs the average costs per head for were practically unchanged; cost per fee earner was 0.8% lower than the previous year whilst cost per support employee rose by just 0.9%.

The average fee earner in the large European firms cost Euro 62,800, which was 8% lower than the previous year. Part of this reduction was due to changes in the sample of firms taking part but amongst those taking part in both years, the majority reported lower costs per head in 2013.

The table shows the median costs per head in £s for various levels of seniority within UK and EU companies.

The ACE Benchmarking report is prepared by The Centre for Interfirm Comparison (CIFC) in collaboration with ACE.
If you wish to take part in the Benchmarking initiative please contact Graham Pontin gpontin@acenet.co.uk

The Falkirk Wheel boatlift (2000 – 2002). Tony Gee completed the structural steelwork design for what is one of the world's largest working sculptures.

"Then out of the blue we got a phone call"

Tony Gee and Partners has been in business for 40 years and from the early days in an office above a launderette in Cobham it has become one of the most respected problem-solving consultants around. Getting there has been an exciting ride as Nigel Yarwood and Neil Farmer explain to *Jackie Whitelaw*.

Nigel Yarwood (top) and Neil Farmer.

For anyone considering how to establish a successful company the Tony Gee history is one to study. From the early days to date the underlying business themes of quality engineering, good networking, and a never say never approach have always been what makes it a popular first port of call for clients and contractors. That, and an ability to take advantage of the unexpected.

Interviewing former partner Nigel Yarwood and current partner Neil Farmer the phrase "and then out of the blue we got a phone call" recurs with surprising regularity when the pair talk about the history of the Tony Gee consultancy; phone calls which set the business off on new paths and delivered, in some cases urgently needed, new revenues.

Yarwood joined the fledgling company early on in 1975 and Farmer in 1988 when staff numbered only 24.

The tale they tell, especially of the early days, has all the ups and downs of a rollercoaster, with the tricky problems all resolved thanks to effort, nerve, lateral thinking and good relationships with previous clients; characteristics that are fundamental to the company still today.

The firm didn't start as the fully formed consultancy it is now but designing bits of kit to build bridges and the like.

The 1970s

Yarwood arrived for his interview in 1975 to find the founders Tony Gee and Frank Rowley ensconced in their small office "ready to conquer the world".

"They were very charismatic and inspirational and I thought, yes, this is what I want to do."

Early work, the result of a good relationship with a modern engineering giant Jean Muller of PSC Freyssinet, was to do with jacking systems for North Sea oil rigs and, important for the later development of the company, prestressing systems for segmental balanced cantilever bridges.

One year after Yarwood joined though and the company hit a difficult patch — the North Sea work had foundered and Rowley headed to Nigeria.

"We'd taken on nine or ten people by then and Tony Gee had the confidence to move from above the launderette to a new office on Cobham High Street next to the Moody Blues, Threshold Records. (Justin Hayward and John Lodge called in to say hello.) There were staff to pay."

The job in Nigeria was particularly key and was to help contractor Reynolds with the design and supply of a launch girder to build bridges from 25m precast beams. "We had to deliver the whole caboodle, which got us our first functional launching girder.

"Frank got the kit out there and went to put it all together. This was the 70s (1976) and communication was not easy. He sort of disappeared for six weeks, until we got a second hand telex to say all was well."

It was all in a good cause. A few months later in 1977 the company won the job for the M180 Trent Bridge balanced cantilever "Eurolauncher" gantry which won a BCSA design award a year later.

"That confirmed our credentials as a contractor's designer on bridges," Yarwood remembers. "We were also churning out our own bridge designs but not getting anywhere so we opted to sell them on to contractors. Looking back we were developing our USP.

"Those early days, they always felt hand to mouth but they were exciting and we were doing some innovative things."

A major milestone for the fledgling business came in 1979 when it won the role of independent checker of the erection of the Kessock bridge in Scotland. And in the same year it picked up a major commission from contractor Stevin to design and deliver the gantry for constructing the extensive approach viaducts for the Orwell bridge in Suffolk. "That was a major triumph," Yarwood remembers. "We'd been pushing an alternative design for Orwell, but this was the next best thing. And it was a great big gantry – 600t of it."

Another leading Tony Gee player, Steve Harridge, had joined the business by then and took on the nitty gritty of Orwell.

The 1980s

Overseas work has consistently been a mainstay of Tony Gee's revenue and an opportunity to develop its skills in markets more open to new entrants than the UK. Hong Kong was to be the next port of call, again for a gantry for Costain on the Eastern Island Corridor; swiftly followed by Tsuen Wan for Paul Y.

"It seemed to be all about gantries then but being in Hong Kong gave us an opportunity to get into a new area. We won geotechnical work on the basement for the Hong Kong and Shanghai Bank Building – we knew it was going to be iconic and it was great for our reputation," Yarwood says.

The bank job was where Tony Gee came into contact with a man who was going to be a future partner – Bob Spackman – who was project manager for the building's steel erection.

This was 1981 and the 80s gave Tony Gee plenty of opportunity on what became some other iconic structures, though they came with their issues.

In particular there was the M25 Gade Valley viaduct. "That was a big deal for us. We'd produced for Fairclough an alternative steel design for the original concrete box girder," Yarwood says. "We'd created an elegant light design to limit tonnage but when it was fabricated in Italy the stiffeners were not aligned and remedial work was needed, creating delays. We were right on the deadline for the opening of the motorway and Steve and Frank had to make the call to put back the M25 opening by Margaret Thatcher for three weeks."

That was an interesting day and a marker to another of Tony Gee's USP's. "The firm doesn't run away from risk, it is something to be managed, and it was managed at Gade," Farmer says.

The 80s continued with high spots including the commission for the Torridge viaduct balanced segmental cantilever gantry, several grade separated interchanges in the US and gantries for eight contracts on the Singapore mass rapid transit.

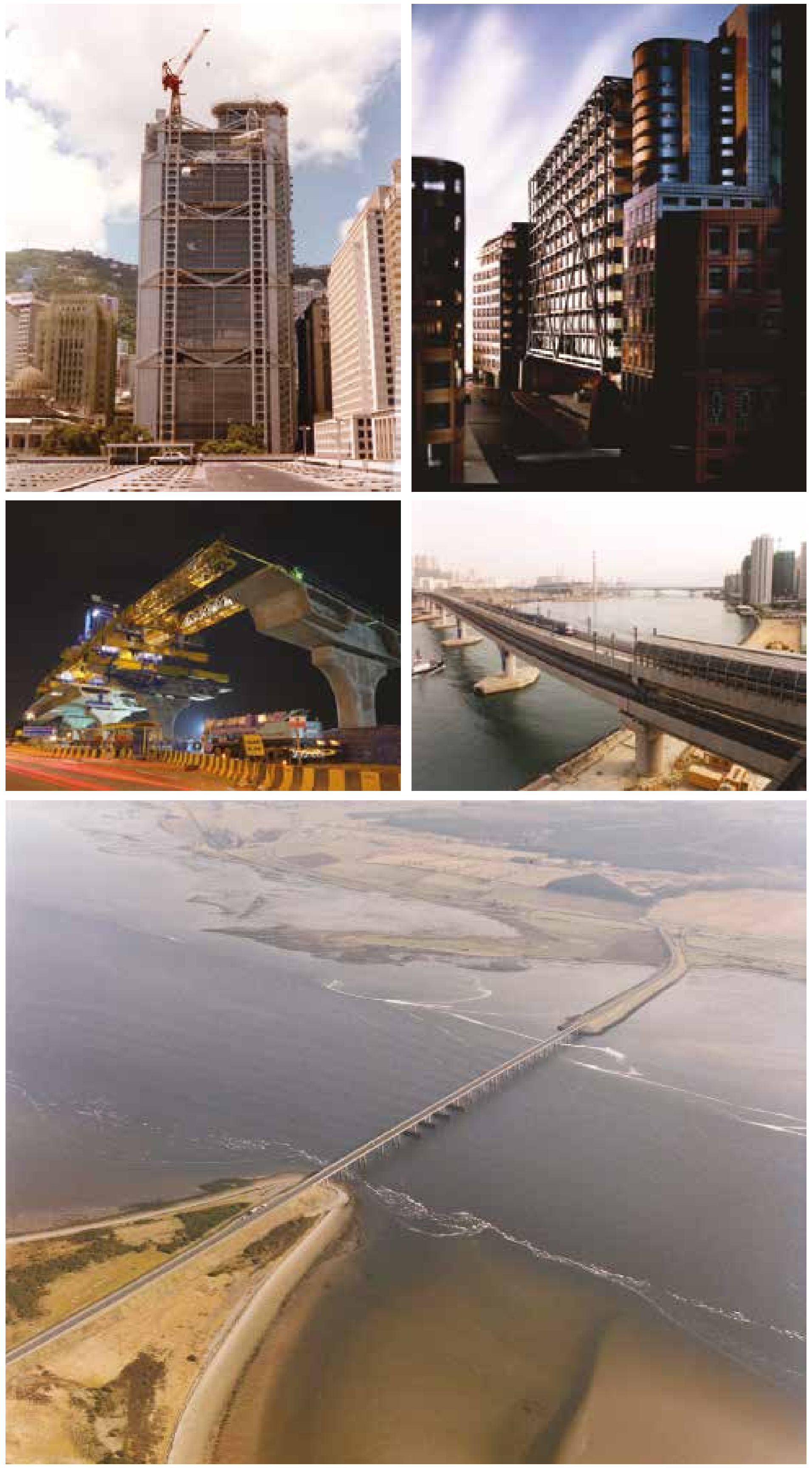
In 1986 Bob Spackman joined the firm, with the intention of taking on the business development and marketing. But pretty much as soon as he arrived there were some of those out the blue phone calls and Spackman found himself back on site.

"He'd wanted a change from being a project manager on big steel frames, but we persuaded him to manage Broadgate Exchange – a great big steel frame," says Yarwood. That was the challenging building being erected across the railway track near Liverpool Street in London.

"Hollandia Bovis Schal, the contractor, wanted Bob and we needed that job," Yarwood continues. Spackman became a partner and went off to the City site for two years.

In 1987 founder Tony Gee retired from the UK business to concentrate on interests he had developed in America. Frank Rowley took over Tony Gee, the business, in the UK at that point.

Meanwhile there came a seminal moment for the business, says Farmer. He'd joined in 1988 and that was the year the company won the design work for the Dornoch Firth launched bridge and very quickly afterwards the Ceiriog launched bridge. "It was important because we were now recognised as having great depth in bridge design, but also because Frank had just taken over the business and it was his first big



Clockwise from top left: Hong Kong & Shanghai Bank (1981-86) – the foundations were the company's first project in Hong Kong; Broadgate Exchange House (1987-89)– Tony Gee completed the temporary support, stability bracing and jacking operation design for the structural steel frame which spans 10 railway tracks; The Rambler Channel bridges (1993 -1997) for Hong Kong's mass transit railway; Dornoch Firth launched bridge design (1988) – a structure that is integral to the Tony Gee DNA; Jamal Abdul Nasser Street Bridge in Kuwait (2011) – Tony Gee designed the deck superstructure for 350,000m² of elevated roadway.

success story. And getting Ceiriog was a huge bonus. That cemented Frank as the face of Tony Gee."

Dornoch was significant for another Tony Gee employee – the current boss Graham Nicholson, who was project engineer on Dornoch – and the structure holds an important place in the DNA of the business to this day.

The 1990s

Everything by the late 80s seemed to be going swimmingly. "And then, in 1990, the market died," says Farmer. "In a sense we were lucky, we were involved with a major industrial plant development in Bahrain – the Aluminium Bahrain Potline, and we won the alternative design for the departures hall and track support structure at Waterloo International terminal. We had changed it to concrete from steel, and the designs had to take into account the post Kings Cross fire regulations so all the escalators were being moved around. If the design had been steel it would have been impossible to modify."

Even with this work the early 90s were looking uncomfortable from a business point of view. The firm had expanded in the late 80s boom and drawn down its reserves and then the work virtually dried up. "We'd gone after the Rambler Channel crossing in Hong Kong with Costain but didn't get it. But as an example of never say never, then came a really memorable moment. Steve Harridge said let's go and see if Dragages (who had won the job) need any help.

"They did. In fact they said, would you like to design it? Apparently they had had the in house capacity to do the tender, but not the detail. Others were chasing it but we won that work and it was huge, bigger than Waterloo. And from there we got the Rambler Channel mass rapid transit crossing. That was all a benefit of us understanding contractors and the work took us right through the dip," Yarwood says.

Back in the UK as the 90s progressed, links with a contractor also gave Tony Gee the design for the Marsh Mills interchange viaducts replacement on the A38 near Plymouth. "The Highways Agency had decided to go design and build which gave us our in," Farmer remembers. "We teamed up with Hochtief and our design was the only one that kept the carriageways open because we would be building the new viaducts alongside the old ones and sliding them in."

The slides were moments of high drama. It was a night of heavy rain and the bridge decks were being slid in

Frank Rowley: The face of Tony Gee until his early death in 2003.

'down-hill'. The brakes were wet and not holding so there was a danger of a runaway bridge moment. "We called a halt," Farmer says and tightened up the brakes, started again and it all went well." They were British civil engineering's largest bridge slides; the replacement viaducts each weighed 5,500t and the work was a national event which featured on TV and was recorded for posterity by the BBC.

Meanwhile, Bob Spackman had finished at Broadgate and managed to get his feet under a desk and his mind onto marketing, when true to form, the phone rang 'out of the blue'. This time, the call was from the Storebaelt East Bridge project in Denmark connecting the country's islands of Zealand and Sprogø. Contractor Alstom needed help managing construction of the 1624m span suspension bridge superstructure, so Bob was parachuted in for a year and got the job on track with all the cables up and deck coming in before he returned to Surrey.

The business was growing nicely in the 90s, Yarwood remembers but what the company did do was build up a regular workload by going into railways following the privatisation of British Rail in 1996. It was a good decision and has been a mainstay for the firm ever since, at one point providing 70% of its revenues (now 56%). Purchase of geotechnical consultant Wilkinson Associates in 2002 and the recruitment of Richard Newman from Arup to head the new geotechnical group, with its understanding of geotechnical assets, helped considerably in building Tony Gee's rail reputation. "We got involved with contractors and were taken onto their frameworks, now we are working increasingly directly with Network Rail."

The 2000s

On the project front, foundations for the London Eye and design of the Falkirk Wheel were just a couple of the schemes keeping Tony Gee in the public eye.

"And then we got a phone call out of the blue from Lloyds Register!" says Farmer. We were wanted for the Independent Verification and Validation team on Taiwan High Speed Rail. That was a massive job with good serious cash flow even if it was a bit off piste for us. We're still waiting for the next one of those…maybe HS2?" he suggests, hopefully.

There was a huge blow for the business in 2003 when Frank Rowley died suddenly aged 62; Graham Nicholson took over and he has led the business ever since (see interview Infrastructure Intelligence October 2014).

From being 100 strong eleven years ago the firm now has over 400 staff and has matured into an organisation that can still react to the big opportunities but with a solid, reliable base of work. Along with rail, highways is now a big earner and the firm is building workload in power and marine. Finding the challenging jobs that require innovation and verve are still at the core of the firm because to keep the good people that give it its reputation it needs the interesting work.

The last decade has seen Tony Gee involved in the Naini cable stayed bridge over the Yamuna river in India; lead designer on the Three Mills Lock that allowed opening up of access to major sites in east London from the Thames, including the Olympic site; temporary works for the roof erection of the new Wembley Stadium; design work on London's first cross river station on Blackfriars Bridge; plus a significant proportion of the East London Line.

In most recent memory, it was Tony Gee that was called in by Network Rail and its contractors to design the repair work on Dawlish sea wall and sea cliffs following the major storms of last winter.

For the future, just as in the 70s, it is still hard for an SME to break directly into major UK projects. "We've always done it by infiltration and through using experience on big overseas schemes to demonstrate our worth," Farmer says. "And we'll keep on doing that. There are some big jobs just kicking off in the Middle East for instance. Developing experience abroad is the way forward, I believe." Tony Gee's journey into the future promises to be just as exciting as over the last 40 years.

See Tony Gee's History in Pictures at www. infrastructure-intelligence.com

RPS: Boredom not an issue

FTSE 250 company RPS turns over £600M a year and employs 5000 staff. Its commercial director for built and natural environment, Europe – *Andy Young*, tells us about the firm.

BIM model of a biomass fuel handling facility – a typical RPS project

RPS is well known for its environmental consultancy. How big a focus does the business have on sustainability and carbon reduction?
Good question. Sustainability often gives the impression of maintaining the status quo but "reduction" is the main word here. Clearly we only have the planet we live on and with a growing population we have to reduce our consumption of energy and reduce human impact to our environment. As a large environmental consultant this is core business for us.

What are you doing in those regards?
For example, we have been developing our expertise in renewable energies for many years and provide advice to our clients on almost all aspects of energy. From simple energy audits, we undertake feasibility studies on alternative energy sources and recommend proposals which can range from photo voltaic panels to a full combined heat and power plant. Some people can't square this work with work the group undertakes in oil & gas exploration. The reality is that the world needs a mix of energy sources and RPS provides advice which is science based and environmentally sound.

Describe the RPS culture
That is a tricky one! I have heard clients describe us as a major international multi disciplinary consultant, while others have described us as a boutique consultant. The answer is that we are what we need to be and what our clients need us to be. Our range of staff embrace science, art, and humanities so the result is we undertake a spectrum of projects of all sizes across every sector – that keeps our staff interested and enthusiastic. Outside of work our staff often pull together to show incredible commitment of effort and self sacrifice to support both their own and our nominated charities.

What current projects best represent RPS?
I always like it when we can provide a one stop shop for a client who perhaps has limited resource but a complex project. Guernsey Airport was a great example of this where we undertook the planning and environmental commissions to gain consent for the reconstruction of the airport's entire airside infrastructure. We then did the engineering design, on site supervision and project management of the complete runway realignment and reconstruction.

We even had to gain permission for the local port to be expanded to deliver plant and raw materials that were not available on the island.

What does your job involve?
I sit on our European board for Built & Natural Environment and have responsibility for seeking out new markets, developing our future work streams and integrating a large and very diverse business with the aim of increasing turnover and profit. Although we are a large business, the speed at which we can adapt to new challenges can be extremely rapid. For me, I think looking at new business streams has got to be a highlight. Getting to understand the economic and political drivers of a new sector, finding out what these new clients want and then corralling a team to deliver is both exhausting and rewarding.

What are your biggest challenges/ opportunities at the moment and why?
Challenges change all the time. During the last couple of years or so, our focus was on ensuring we had enough work to keep our staff busy and be in a position to respond to the marketplace when the economy eventually picked up. This year, expansion is the largest challenge. A lot of skilled professionals have left the industry over the last few years of recession and as more project opportunities arise I believe maintaining sustainable growth will be the largest challenge for the whole industry.

Our planning and development and infrastructure businesses are firing on all cylinders again. Residential, retail and manufacturing all seem to be throwing up good opportunities. Energy and transport remain a big focus.

What are the best things about working with RPS?
Without doubt, the best thing is the diversity of work. This week I have been working on projects relating to highways, distribution logistics, HS2 and environmental reports for shale gas – boredom is never an issue. We provide over 260 discreet services ranging from planning & environmental services, through design activities such as engineering and architecture, but also occupational health, risk services to the nuclear industry and through a recent acquisition have now a significant heritage business. Bringing these often discreet services together on one project shows our potential to provide a really comprehensive service to our clients.

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CEEQUAL
IMPROVING SUSTAINABILITY

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www.ceequal.com

Rethinking redevelopment

Innovative thinking on remediation of contaminated land can deliver major savings and enable more brownfield development says *Dr Ian Ross* of ARCADIS.

In September the Campaign to Protect Rural England (CPRE) called on the UK government to do more to encourage development on brownfield land. It argued that greenfield development was increasing while construction on previously developed sites was declining. Unfortunately it said that national planning policy is acting as an obstacle to development on brownfield land with out of date local planning documents failing to realise the potential of such sites. At the same time CPRE also said that developers considered brownfield unviable because of perceived high risks, costs and complexity associated with its development.

"Often if you are not involved in remediation it can seem really complicated, so we use the experience that we have as a company looking at this on a day to day basis to simplify it," says Dr Ian Ross, a partner in the environment division of consultant ARCADIS and an expert in the assessment and remediation of contaminated land. "It is always about management options for the sites, it is not always about remediation," he says explaining that the level of treatment required will depend on both the local regulations and the end use planned for the site. "We can come up with goals which have greater potential than the site owner expected and that means that remediation costs come down/are significantly reduced," says Ross. "For example we are doing a project where domestic properties are planned on top of a large spill of chlorinated solvent. If the developer moves the car park and puts that over the spill they can have much more attractive targets which means less remediation and saves a lot of money," he says.

Smart management is a key feature of the work that ARCADIS does both in the UK and worldwide. In late October it won its 6th consecutive Brownfield Briefing award for its work on verifying the remediation of an oil terminal, where it proved that the degradation of residual oil was fast enough that the risks could be sensibly managed. The method is called natural source zone depletion and is already used in the US. Guidance for its use is still being written in the UK. "We are the first to bring technologies and new methods in to the UK and often that is because we are very strong in the US where the market is more technically mature," says Ross pointing to high resolution real time investigation as being one of the tools that the company has been using ahead of its competitors. "We can put probes in the ground that can tell us within three minutes what is down there. We have probes that send down lasers that fluoresce hydrocarbons and can characterise and give some idea of their concentration instantaneously. As well as using traditional methods such as a drill rig to collect soil and groundwater," he says.

"We can come up with goals which have greater potential than the site owner expected and that means that remediation costs come down"

Dr Ian Ross

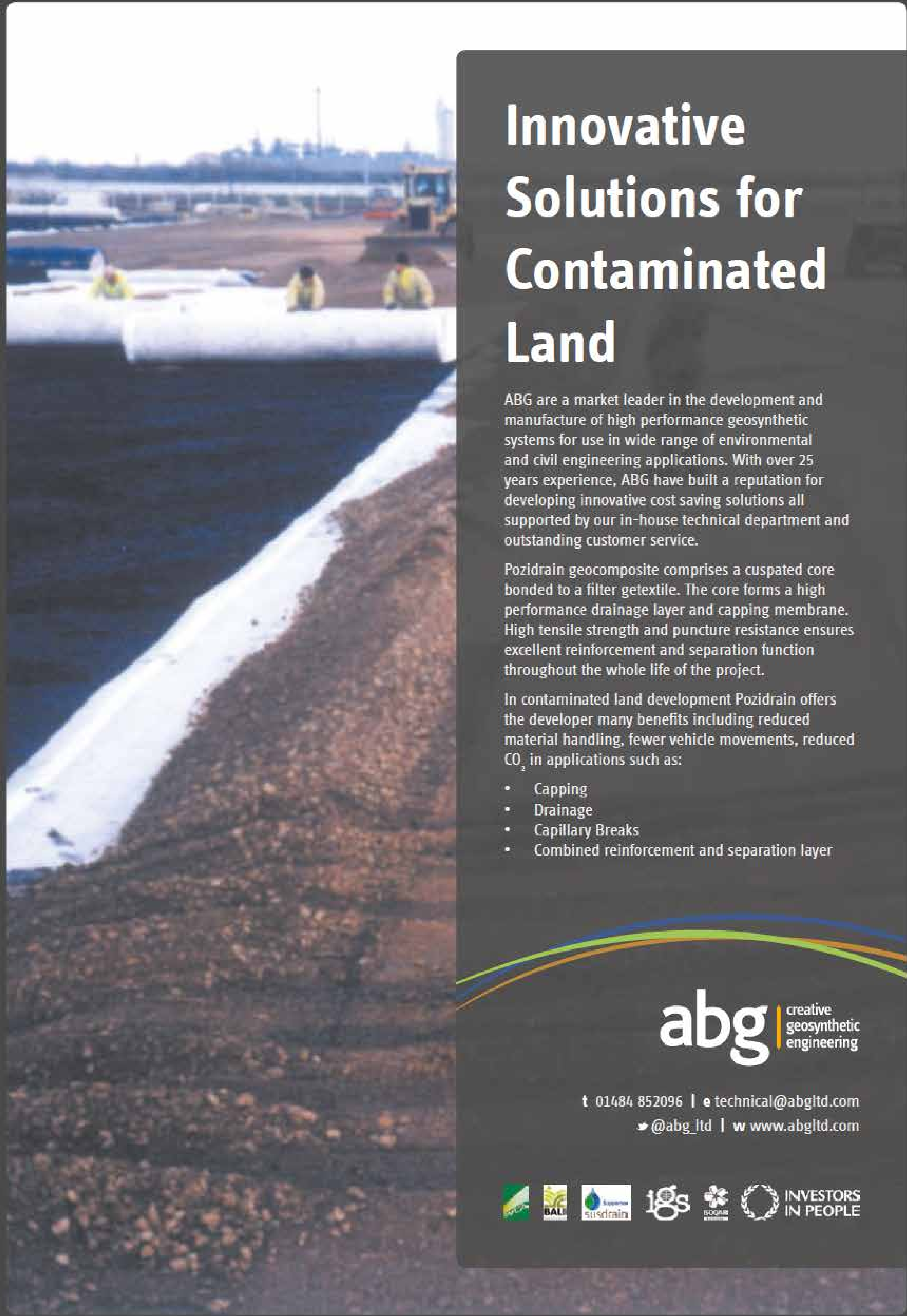
The results speak for themselves. In 2012 the company won a multitude of awards for an innovative method developed by Ross which saw the world's first in situ remediation of a solvent called carbon disulfide (CS_2) using activated persulfate. In the past the highly volatile and flammable solvent would have been mixed with a bentonite slurry and sent to landfill, but the new method saw persulfate added to groundwater to safely chemical oxidise CS_2 in situ, breaking it down and detoxifying it. Used in situ on site the method saved the client £20M and with many further sites to consider, via reserves set for environmental remediation the overall cost savings to the client were very significant.

That so much innovation is underway will be welcome news to developers. Ross says that he is seeing increased interest from chemical, pharmaceutical and automotive industries looking to divest assets. At the same time a recent study by ARCADIS highlights that surplus property is acting as a barrier to growth for firms as capital is tied up in non-revenue generating assets. Some good investigation and sound planning could mean that redevelopment costs less than owners think, and breathe some new life into brownfield sites.

Dr Ian Ross will be presenting at the EIC annual conference on 2 December in London: http://www.eic-conference.co.uk/speakers/dr-ian-ross/

ARCADIS Surplus Property report: http://www.arcadis.com/disposal_surplusproperty.aspx

More on the CPRE Waste of Space campaign: http://www.cpre.org.uk/how-you-can-help/take-action/waste-of-space



Runways – assessing the options

The Airports Commission has put out new consultation assessing the impacts of all three south east runway options. Time for the regions to take a view.

Early in December the latest in the Runways series of events takes place, a series which focus on the progress of the Airports Commission and its investigation into the best place for the south east to site a new runway. This time the event is being held in Manchester and concentrates on the views of the regions as to what would be the best option for them.

Timing is good. This month the commission released its latest consultation on the three options still on the table – a new runway at Gatwick, a new runway at Heathrow and the Heathrow Hub dual operation runway.

The consultation which closes in February offers assessments of costs, financing, carbon and noise impacts and business plans among other things.

The commission's final decision will be based on far more than which option is easiest to construct and likely to face the least opposition (although it may be hard to divert political minds from those highlights). It will be about what is the best solution not just for the south east but also for the whole country. Is a new runway at Gatwick that the Commission's consultation anticipates will largely cater for point to point air services the right answer or should it be one of the Heathrow solutions that allow that airport to develop its international hub capacity? For regional airports looking to expand those are important issues and now is the chance for them to make their views known.

Overall, the commission found that the cost of a new runway for the south east has been underestimated by all three contenders. A new runway at Gatwick would be cheaper though possibly trebling the number of people affected by noise; the Heathrow options would be more costly but the GDP benefits would be significantly greater, with major local effects but at 5km distance "bundled quality of life" impacts would be broadly neutral.

Gatwick

Construction – £9.3bn, higher than Gatwick's own estimate of £7.4bn. Supporting infrastructure can be built in phases in line with increase in passenger demand spreading the cost and with the potential that the final phase of construction may not be required, reducing the overall investment by £2bn.

In terms of financing Gatwick Airport Ltd may have to raise additional equity of up to c. £3.7 billion and additional debt of up to c. £14.3 billion. This level of finance is not unprecedented for infrastructure projects and airports, the commission said.

- Passenger aero charges would need to be £15-£18 (currently £9)
- Surface access costs are put at £787M.
- Passenger numbers would more than double from 45M to 95M.
- GDP benefits would be £42-£127bn.

Heathrow Hub

Construction – £13.5bn compared to Heathrow Hub's estimate of £10.1bn.

Heathrow Airport Ltd would have to raise additional equity of £5.1bn and up to £24.9bn of debt putting it at the highest end of the range for financing, infrastructure projects in the UK, a level described by the commission as "challenging".

- Passenger aero charges could be £27-£28 (currently £20)
- Surface access costs of of £2.1bn to £6.3bn depending on scenario though cheaper surface access option of a Western Rail Access would have "transformative catalytic benefits for locations on the Great Western Main Line".
- Passenger numbers would reach 126-142M (currently c72M)
- GDP benefits would be £101-£214bn

Heathrow new North West runway

Construction – £18.6bn compared to Heathrow Airport's estimate of £14.8bn. Heathrow Airport Ltd would have to raise additional equity of £8.4bn and debt of £29.9bn, putting the airport at the highest end of the range of financing for infrastructure projects, the commission said.

- Passenger aero charges of £29 (currently £20).
- Surface access costs of £800M.
- Passenger numbers of 132-149M (currently c72M)
- GDP benefits of £112-£211bn.

The December's Runways event is taking place on 2 December at Manchester Airport with the purpose of developing regional responses to the Airports Commission's consultation. Key speakers include Sir Howard Davies, chair of the commission, and Sir Richard Leese, chair of the Core Cities Cabinet and leader of Manchester City Council. Also at the event will be aviation contractor Colas which employs specialist teams to work with both civilian and defence clients to identify innovative technologies and techniques for construction and maintenance of airside and landside projects. Colas has worked in several key mainland and island locations, from Manchester, Gatwick and Birmingham to the Falklands, Jersey and the Isle of Man. Areas of innovation include a focus on pavement technology - the company was the first UK contractor to introduce a European runway specification - and surface recycling. Colas has its own mobile asphalt plants which means mobilisation for a project can be quick and uncomplicated, with a guaranteed on time supply of asphalt.
Find out more about the Runways events at www.runwaysuk.com
Check out the Colas video at Runways and on www.infrastructure-intelligence.com to find out more.

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Keith Bentley – Life beyond BIM in the new age of innovation

For the last 30 years Bentley Systems founder and chief technology officer Keith Bentley has masterminded the infrastructure software firm's technical development as it navigates the accelerating digital revolution.

When Keith Bentley founded Bentley Systems 30 years ago his mission, he says, was simply to automate the creation of construction drawings. Even if they had thought bigger, he adds, the computing power available at the time wouldn't have permitted anything much beyond this aim.

Since then, the ambition has certainly accelerated, with the firm now a driving force behind the Building Information Modelling (BIM) revolution. And with its latest Bentley Connect Edition release, it is pressing forward with new technology and ideas to put digital data at the heart of long term global infrastructure asset management.

As a founder of Bentley Systems and principal architect of the firm' technology direction he remains a driving force in guiding the firm's future strategy, taking BIM "from a software architecture to a business process".

In the new "age of innovation", he says, the challenge will be bridging the gap between the real world and the digital models as we manage global infrastructure not just throughout the design and construction process but across the whole of asset management.

Interview by Antony Oliver

You founded Bentley Systems 30 years ago. How has the landscape of construction computing changed since then?

I remember back in the early days trying to convince people to think broader than just automating the production of drawings. I thought I had a great idea but people said "Keith you don't get it – we can't change the process – we are just a little guy – go tell the owners". And the owners would say "yeah, well it's been like this for the last 100 years and there are just too many people involved in the process to change". But today I feel positive when I hear people accept that the only thing that can make any real difference [to efficiency in construction] is changing the process.

While technology drives your business, BIM is ultimately about people, process and culture. Did you imagine that in 1984?

No, I thought it was impossible. I was discouraged beyond words when I proposed solutions that involved slight modifications to people's workflows and we were told in no uncertain terms that "sorry we are not looking to do that because we can't". So [it's great] to imagine 30 years later more or less all those obstacles have been more or less overcome.

There is a feeling that the UK is leading the way? Is that how you see it?

One of the things that is most impressive is that in the UK it is the government pushing the private industry – I don't know how that happened! There must have been some pretty forward thinking people who got together and said we need to work on this.

So convincing people of the process of change is more important than the technology?

You could have the smartest technology with the coolest demo of the newest solution but if people say "that's not the way I work and I'm not prepared to change the way I work" then you are wasting your time. If you look at the BIM world – and I'm not really sure what that is – I'm not entirely sure at which point BIM changed from a software architecture to a business process but I am all in favour of it.

What will the big changes be in the future?

I think we need to focus more on the business problem that needs solving than the independent pieces of geometry or graphics. Today it is geometry first but in future I think we will defines things in term of "I want a building that has these qualifications and inside has these systems to help do this". I don't mean to imply that we won't have all of the same tools for creating geometry and there are reasons why you must know the physical properties of things so that you can design better. But it is business first then physical.

How hard is it to stay ahead in a market that includes firms like Google?

You could look at Google and say yes they have an infinite war chest to work on any problem they like. But they are likely to focus on the problems that have the broadest appeal. So when you talk about the tough problems [faced by the construction industry], Google would probably think they are thankless. So I don't really worry so much about Google – whatever they do, we will interface to it. The market is likely to consolidate further and I worry about a lot of things but Google isn't one of them.

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Securing talent by looking beyond the wage

Finding the best staff is not just about the money. Matchtech's *Grahame Carter* supplies a checklist of items to attract new employees.

Today's engineering industry is intensely competitive when it comes to recruitment and that's especially true for organisations working in infrastructure.

In some areas, like CAD design, employers are able to outsource work to offices abroad relatively easily to plug any skills gap they encounter. However, the delivery of massive infrastructure projects such as Crossrail and network upgrades always requires people on the ground. We are already using the term 'skills shortage' for some disciplines within the infrastructure sector; it is not that easy to secure home grown talent to fill the roles that are opening in the UK's rapidly growing infrastructure sector.

In order to attract and retain the best talent, employers need to understand what motivates teams and what they're looking for from their job – and that is often about more than salary.

To scope the views of those working in the industry, Matchtech recently surveyed engineers in the UK infrastructure sector as part of our annual engineering 'Confidence Index;' the results show engineers' ambitions are strong, with 71% saying they expect their careers will progress in the next 12 months.

Furthermore, over half of infrastructure engineers said they would be prepared to move abroad if the circumstances were right for them. Of these, a majority of 45% said they'd like to work abroad for a lifestyle change, and 20% said better pay would draw them overseas. So what can employers do to source the right candidates for them and ensure that they choose their company and projects in the UK?

Infrastructure projects do of course have finite budgets therefore employers cannot solely rely on dishing out hefty pay packets to entice sought after candidates, and must think more creatively about how they promote their business and other employee benefits. Besides, pay is certainly not the only consideration for candidates when hunting for a job.

ATTRACTING STAFF – CHECKLIST

- ✔ GOOD SUSTAINABILITY CREDENTIALS
- ✔ SUPPORTIVE CULTURE
- ✔ DIVERSE WORKFORCE
- ✔ REGULAR TRAINING IN NEW SKILLS AND TECHNOLOGIES
- ✔ OPPORTUNITY TO WORK OVERSEAS
- ✔ FLEXIBLE HOURS
- ✔ OPTION TO WORK FROM HOME
- ✔ FAMILY FRIENDLY POLICIES
- ✔ INTERESTING WORK AND ABILITY TO MOVE ROLES INTERNALLY
- ✔ HIGH PROFILE/CHALLENGING PROJECTS

More flexible working, for example, is an increasingly sought after benefit. As our Confidence Index found, lifestyle change accounts for a large proportion of engineers considering moving overseas, so the UK industry has to be willing to enable working from home, time to travel and time for family. This can be a tall order when operating against strict project deadlines and facing a mountain of work, but flexible working doesn't mean less work is completed.

It's about nurturing an efficient working environment, enabled by individuals' preferred working times and methods. Furthermore, individuals must be regularly offered new opportunities to keep them engaged, so flexibility to move to other projects or engineering disciplines is also an asset that infrastructure organisations should make more of.

Defined training programmes are also important in attracting staff, as engineers are always keen to develop their skills and stay on top of new technology and techniques. However, employers are sometimes reluctant to train staff in new skills as they worry about them swiftly moving onto another job, meaning the investment is 'wasted'. This is deemed particularly risky with contract appointments, but rather than worrying about whether engineers will leave after training, employers should be asking themselves, "What if people don't leave and they aren't trained?" Ultimately a business must ensure its experts are at the forefront of the industry, and by implementing a structured training programme they are more likely to draw in the talent they want and keep them for longer.

Aside from employee benefits, the project itself is a major draw for candidates. Our survey showed that over one-in-ten would consider moving abroad to pursue more interesting projects, so UK employers need to think carefully about how they promote the attributes of the work they are offering on home soil. Selling the project should be considered equally as important as selling the business. Of course projects come and go, but they will be a decisive factor for the candidate, so offering direct insight to the type of project work underway can be helpful in conveying the opportunities available and specific project elements.

Finally, employers must not discount the importance of their company credentials in terms of sustainability and working environment. Does the business have a consciousness beyond itself? How does it support a positive working environment? Does it have a diverse and balanced workforce? Are employees given the opportunity to work closely with more senior experts? Addressing questions such as these, and giving a picture of the business 'ethos', is essential in not only encouraging candidates to choose your organisation, but also in ensuring the candidates are the right fit for you and retaining them.

Want advice?

You can contact Grahame at grahame.carter@matchtech.com or on LinkedIn

ACE manifesto sets "practical, pragmatic and achievable" plans for new government

Cross party consensus on the development and implementation of infrastructure projects remains crucial says ACE in its election manifesto.

Any future government must work across party political lines "to provide industry with the certainty it needs to invest in our future", according to the Association for Consultancy and Engineering's (ACE) in its new election manifesto.

With six months to go before the UK General Election ACE has set out its desire to see the next government embrace long term infrastructure investment planning and sets out recommendations which it describes as "practical, pragmatic and achievable".

"Although we have achieved a lot there is still more to do. As a country we need to develop a greater cross party consensus on the development and implementation of large scale infrastructure projects," says ACE chief executive Nelson Ogunshakin in his introduction to the manifesto.

"More needs to be done to link societal needs with government delivery within national and regional frameworks," he adds. "We also need to unlock the huge potential of our cities to grow their economies and meet their residents' needs and create social value."

The manifesto focuses on seven key areas of policy which require "the committed support of the UK government to meet the challenges the country faces".

These critical areas are Transport, Utilities, Housing, Finance, Procurement, Sustainability and Skills. For each the ACE manifesto sets out a list of recommendations which, it says, all political parties should work together to support and embrace.

Transport – £112bn transport investment identified in the National Infrastructure Plan

To deliver transport for a growing economy government should:

- Continue its roads reforms – commit to providing the Highways Agency with a fixed revenue stream in the form of Vehicle Excise Duties to give the same security of funding Network Rail enjoys through the track access charge regime.
- Commit to Crossrail 2
- Begin preparatory work on HS2 Phase 2 & HS3 –
- Give the regions more say over infrastructure investment.
- Decide quickly on Airports Commission recommendations for airport hub development.

Utilities -£240bn utility investment required. £8,847 investment per household

To deliver utilities for a growing economy government should:

- Improve transparency and competition –explore models such as ACE's Priority Auction Mechanism (PAM) which aims to improve pricing and transparency.
- Secure energy supplies as this is now critical – create a number of Generation Investment Vehicles (GIVs) to complement the Electricity Market Reforms.
- The UK should aim to have 50% of all broadband connections at 100mbs by 2020, rising to 90% by 2025.
- Smooth and co-ordinate investment – With an increased emphasis being put on Regulated Asset Base (RAB) models of investment.

Housing – the UK must build 886,000 houses if current demand projections are to be met

To enable future generations to own their own homes the government should:

- Implement the ACE's LOVE model – The 'Land Optimisation Value Extraction' model will ensure all parties involved in developing land for housing are able to share in the uplift, thus incentivising development.
- Provide guarantees in the event of a fall in land values.
- Create stability in social housing policy – ACE's housing models suggests a flat 15% provision of social housing within a development with an option to purchase up to 15% extra.

Finance – $24.6tr value of funded pensions market. £375bn NIP pipeline investment requirement

To unlock private finance the government should:

- Create funding certainty – the government should extend the six year funding profiles for government departments to 10 years.
- Improve policy certainty
- Improve regulatory consistency.
- Recognise that alternative finance is a long game – Pension funds may help to invest in infrastructure in the future but the need for structural and cultural change is significant.
- Devolving investment opportunities –Models such as Tax Increment Financing (TIFs) and PF2 allow such solutions and could be effective tools to leverage the investment the UK requires.

Procurement – £230bn spent annually on procurement. UK construction is worth £100bn

To ensure strategic investment through procurement the government should:

- View procurement as an investment mechanism – Encouraging all public sector construction client organisations to view procurement as an important element of investment in supporting regeneration, growth at national, regional and local level.
- Endorse the critical role of the construction/infrastructure client.
- Encourage wider public sector to adopt initiatives to secure whole life value for money and supply chain efficiency and innovation.
- Utilise progress to date in the future.
- Encourage a collaborative debate on procurement reform between the public sector and industry.

Sustainability – the UK must reduce its emissions by 80%. The UK emitted 569M tonnes of carbon dioxide in 2013

To ensure future growth is sustainable as well as economically beneficial the government should:

- Implement fully the recommendations from the Infrastructure Carbon Review.
- Ensure that any new runway capacity aligns with long term emission obligations
- New energy generation must enable ongoing decarbonisation – a 2030 energy decarbonisation target should be set in line with advice from the Climate Change Committee
- Reduce construction side emissions
- Brownfield land remains an underutilised resource – the cost of preparing such land for development could be met by capturing the land value uplift that occurs as development takes place.

Skills – The UK faces a shortfall of 36,800 qualified engineers by 2050

To ensure the UK has the engineering skills it needs the government has to:

- Improve careers advice to ensure that it is appropriate, well-informed and widely available, setting out the various career paths open to them including apprenticeships.
- Increase incentives for STEM teachers
- Reach out to a wider audience – government should develop plans to boost the diversity of engineering undergraduates and apprentices.
- Provide more support for apprentices.
- Ensure viability of HE programmes – The government should commit to a review of funding arrangements for engineering degree courses.

Read the manifesto at www.acenet.co.uk

ACE European CEO Awards winners revealed

Former Arup chairman, now Environment Agency chairman Sir Philip Dilley and Mårten Lindström, the boss of Swedish Consultancy More10, each won the top accolade Lifetime Achievement Award at the ACE European CEO Awards in November.

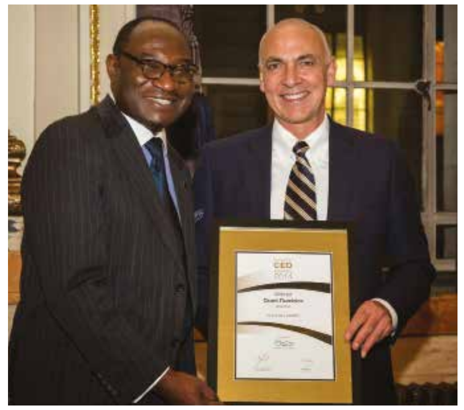
Both men thanked the judges and promised more to come in their careers. Sir Philip said: "My next big chapter is the Environment Agency and I hope you see the results in the coming months and years.

Lindstrom said that his career, first in consultancy, then contracting, then back to consultancy again had given him good perspective on the industry. He also urged the audience to make sure they read all their emails. The Swedish consultancy organisation had nominated him for the award and the first he knew of his prize was from an email from the ACE in London.

Other winners on the night were:

- Mouchel CEO Grant Rumbles who won the Sterling Award, given in recognition of an individual who has made a major difference transforming a business;
- Philip Jones of Phil Jones Associates who won the small firm CEO of the year award;
- Richard Crowe of Irish consultancy Nick O'Dwyer who won the medium firm CEO of the year award;
- and WSP UK managing director Mark Naysmith and AECOM CEO for Europe, Middle East and Africa Steve Morriss who both won awards as CEOs of the year in the large firm category.

ACE chief executive Nelson Ogunshakin congratulated the winners and their roles "in leading an industry that is going through major changes for the good".





From the top: ACE CEO Nelson Ogunshakin with Grant Rumbles, CEO of Mouchel; AECOM's Steve Morriss (left) and WSP's Mark Naysmith (right) with Keith Howells, chairman of Mott MacDonald which sponsored the large firm category; Marten Lindstrom, Sir Philip Dilley and ACE chairman Chris Cole; president and CEO of TYPSA and FIDIC president Pablo Bueno and Richard Crowe of Nick O'Dwyer and Philip Jones with Nelson.

VINCI takes top prize in contracts awards

VINCI Facilities and Peabody were declared overall winner at the Project Partnering Contract/Term Partnering Contract Awards following the PPC/TPC Annual Conference this month.

ACE chief executive Nelson Ogunushakin said: "With Social Value as a theme for this year, all shortlisted awards were of outstanding quality. The VINCI Facilities/Peabody submission was a first class example of CSR and social value initiatives enabled by TPC 2005. The project showed VINCI Facilities adding more than just the standard tendered position on employment and skills planning by seeking to improve literacy in 0-5 year olds in deprived wards in Hackney and Tower Hamlets."

Call for entries: Consultants of the Year 2015

It is time to get your entries in for the prestigious Consultants of the Year 2015. The awards which are organised by NCE and ACE, are seeking entries from talented professionals who are committed to their career in the consultancy and engineering sector and have views about the role consultants and engineers play now and in the future.

Young Consultant of the Year Award

Young Consultant of the Year Award recognises excellence and talent in the field of consultancy and engineering. This year, any degree qualified consultant or engineer aged 35 or under by 20 March 2015 is eligible for entry and the process is by self-nomination. Entries are encouraged from those who are committed to their career and have an opinion about the role consultants and engineers will play in the future.

Outstanding Achievement Award

Outstanding Achievement Award recognises a firm, team or individual involved in work that has gone above and beyond the norm are ambassadors for our profession and exemplify the contribution that our industry makes to our society, environment and quality of life.

To enter or find out more go to the events section of www.acenet.co.uk

Closing date is Friday 23 January 2015.

Liz Truss: agenda for DEFRA

Liz Truss will have had under a year to make a mark as Environment Secretary before the election. EIC executive director *Matthew Farrow* notes she has interesting ideas but is avoiding complex issues of changing public behaviour.

I recently attended what was billed as the new-ish Environment Secretary Liz Truss's 'first speech on the environment' – her prior speech to the Conservative Party Conference having consisted of a slightly awkward championing of the British food industry. Such speeches are an opportunity for a new Secretary of State to set out some defining themes for their term of office – what they want to do with the portfolio the Prime Minister has granted them.

In Liz Truss's case the context in which she made the speech was not the easiest. However successful she is, her tenure in the post is likely to be less than a year, with the last couple of months effectively taken up by election campaigning.

More significantly, the environment has not been happy terrain for the Conservatives since 2010. Expectations had been raised very high by the 'greenest government ever' rhetoric, whereas the early years of the new Government in Defra were marked by severe budget cuts which eroded the department's expertise, a Waste Policy Review which was more policy fine-tuning than the great leap forward then Environment Secretary Caroline Spelman had promised, and of course the forestry sell off debacle (caused, I'm told, by No 10 bouncing Defra into announcing what was supposed to be innovative new policy thinking before it was ready). The tenure of Owen Paterson, Spelman's successor, was marked by thinly-veiled scepticism over climate change, the vexed science of the badger cull, and last winter's floods.

Given this context, Liz Truss's main aim is inevitably to limit any electoral risks for her party from environmental issues in the run up to the election. In the speech she tried to do this in two ways.

First, she said she wants to anchor Defra's activities in the drive for economic growth. This is reasonable, and her argument that the UK's food and rural economies are dependent on an environment in 'top condition' is sound although the speech sidestepped the debates about intensive farming practices and GM crops. But I was disappointed she didn't make more of the growth prospects of the UK's £100bn environmental industries which the EIC represents.

Second, she said she wants to refocus public perceptions of environmental policy onto local benefits in terms of things like wildlife habitats, clean water and air and protecting local ecosystems – the speech was accompanied the launch of a new pollinator strategy to increase the bee population. There is some sense in this as climate change has been the dominant environmental issue in the last decade and some rebalancing is needed.

But the political benefit for the new focus is that it avoids issues where the public needs to change its behaviour to help tackle complex issues where the benefits are global not local. Climate change is an obvious example, and it was only mentioned in passing, another is waste and recycling, which was not mentioned at all, despite a flat-lining of recycling rates in the last couple of years.

Ms Truss is desperate to steer clear of arguments about weekly rubbish collections, the number of recycling bins, the role of incineration plants and whether people fly too much. All these things matter though, and cannot be ignored for long.

The other component of the speech was the argument that Defra was looking at ways to apply 'big data' to the analysis of environmental issues. This is an interesting idea, which echoes work we are doing at EIC on the relevance of the smart cities agenda urban environmental problems, but needs to be fleshed out more.

Liz Truss had been due to speak at next month's EIC Annual Conference but will now be on a trade mission in China and the Defra speaker will be junior minister Lord de Mauley. It will be interesting to see how closely his speech follows that of his boss, and how it compares to the agenda put forward at the conference by Shadow Environment Secretary Maria Eagle for Labour and the man in charge of the environmental sections of the LibDem manifesto – Duncan Brack.

The Environmental Industries Commission is the leading trade body for environmental firms. www.eic-uk.co.uk

Find out about the political parties views on the environment at the EIC conference 'Establishing a Green Agenda' on 2 December. For details go to www.eic-conference.co.uk

SME Consultant of the Decade

ACE/NCE Consultant of the Decade Awards

Tony Gee

Celebrating 40 Years

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