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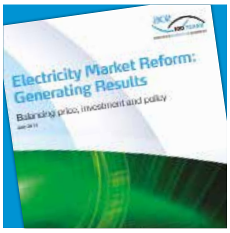

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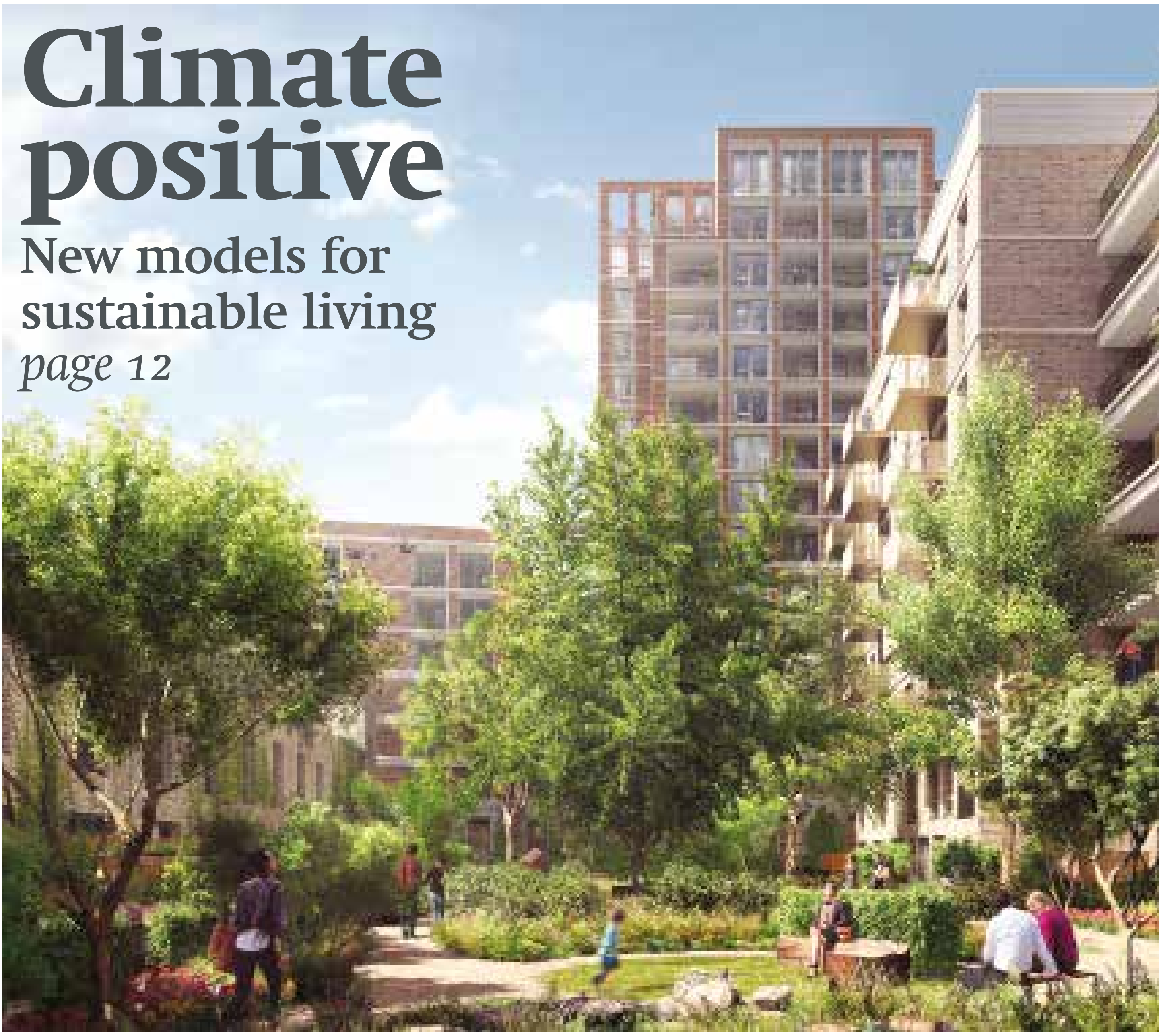

INFRASTRUCTURE Intelligence

Produced for the industry by the Association for Consultancy and Engineering

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MESSAGE FROM THE EDITOR

The implications of this month's jaw dropping news that AECOM is to acquire URS Corporation and create a new engineering firm with 95,000 staff and $19bn revenues cannot be overlooked.

The shockwaves are still bouncing around the market as competitors, clients, partners, suppliers and employees of these two firms get to grips with the new paradigm and assess the threats and the opportunities.

In the world of global engineering consultancy, consolidation has been the way of the past and will certainly be the way of the future. Yet, regardless of scale, the question still remains: how do you make it work?

Acquisition is about accelerating the drive for growth, finding economies of scale and boosting market clout. It must therefore also be about accelerating the drive for greater profit.

And no matter where you sit in the market, relationships are critical. People buy people. Their skills and their culture.

The AECOM deal will be signed and sealed in October. The critical thing must therefore be that, by the time they get to that point, the people-centric business that they just shelled out $6bn for has hung on to those inevitably nervous people.

And as we heard clearly at this month's business round table (see page 22) finding the right people with the right skills and culture is still a limiting factor when turning economic growth into increased profit.

In every business acquisition or merger, regardless of size, two things remain critical to future success.

First is achieving a unified culture which inspires staff behind the new common cause. Second is convincing existing and future clients that the additional business scale and focus on integration will not distract from servicing their needs. Why, the question will be, is bigger necessarily better for me?

Over the next few months AECOM will have its work cut out on both challenges. Success will mean more efficient and effective services for clients and greater career opportunities for more engineers.

In effect the same as everyone else in this increasing buoyant market.

Antony Oliver,
editor, Infrastructure Intelligence

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News roundup

ENERGY

The bill for cleaning up Britain's nuclear waste has risen to more than £110bn, after a £6.6bn increase in the cost estimate for work required over the next 120 years. The Nuclear Decommissioning Authority said in its annual report that the biggest increase derived from a fresh assessment of the work required at Sellafield, now estimated to cost £79.1bn.

Hinkley Point C has moved forward a small step after National Grid's connection application for the new nuclear station was accepted by the Secretary of State for Communities & Local Government. The application is for a connection to run between Bridgewater in Somerset and Seabank near Avonmouth.

Windfarms are to be banned in Scotland's national parks and national scenic areas under new planning guidelines announced by the Scottish Government. The move, part of the National Planning Framework, will offer protection to nearly a third of Scotland's land area.

Fracking should and will proceed in Scotland despite the existence of only relatively "modest" amounts of shale gas and oil, ministers have said. A British Geological Survey study of shale resources in Scotland's "Midland Valley", spanning Glasgow and Edinburgh, estimated there could be 6 billion barrels of oil and 80 trillion cubic feet of gas beneath the ground. There is believed to be 1,300 trillion cubic feet of shale gas in Northern England.

WYG has been appointed as a partner in a consortium, led by AMEC, that has been appointed as preferred bidder for Poland's first nuclear power plant. The contract, expected to be confirmed in the next few weeks, will be worth a minimum of £6.2M to WYG, rising to £35M if optional work is undertaken over the 10 years of the job.

It's summer so it must be time to take in the cutting edge design of Hyde Park Serpentine Pavilion. Engineer for the Smiljan Radic design was AECOM and the firm's associate director, building engineering Tom Webster explained that the architect based the design on his 2010 papier mâché sculpture, The Selfish Giant's Castle, inspired by the Oscar Wilde story. "He envisaged a life-sized re-embodiment of this – a fragile shell suspended on large quarry rocks. The hollow, cylindrical structure, gives the sensation, from the inside, of being suspended in air as if floating; a feeling heightened by the semi-transparency of the shell" Webster said. "For the material we chose glass reinforced plastic because it is relatively light and very strong, and because of the flexible nature of the material before the resin has cured, it can be moulded to any shape. We were able to form the GRP off-site and then transport the form in 57 sections."

AIRPORTS

A report by York Aviation and Oxford Economics for London's Mayor claims that a new four-runway airport to the east of London would allow for eight additional domestic routes, connecting cities such as Cardiff, Dundee, Liverpool and Newquay to a UK hub.

An airport in the Thames Estuary would present a "considerable cost and risk to the taxpayer", according to reports published by the Airports Commission. London Mayor Boris Johnson has proposed an estuary airport on the Isle of Grain. Four studies into the feasibility of the airport have been published. They state airlines and passengers believe the scheme would carry "significantly more risk than opportunity".

ROADS

Plans to impose a 60mph speed limit on parts of the M3 and M1 motorways to cut air pollution have been put on hold. Transport Secretary Patrick McLoughlin has given the Highways Agency 18 months to devise alternative methods to tackle pollution on a 50km stretch of the M1 in Derbyshire and South Yorkshire and 4.5km of the M3 in Surrey. If none can be found a 60mph limit could still be imposed at peak times.

Balfour Beatty has been appointed by the Highways Agency for the £35M dualling and improvement scheme to the A21 between Tonbridge and Pembury in Kent. The scheme will deliver 4km of dual carriageway on the main road link between London and Hastings.

Welsh transport minister Edwina Hart is standing by the decision to invest £1bn in new motorway to the south of Newport given the go ahead, despite opposition from members of the cross party environment committee.

RAIL

A Keolis Amey joint venture has won the £700M deal to operate the Docklands Light Railway to 2021, beating incumbent Serco which has been running the DLR since 1997. The contract begins on 7 December and runs until April 2021, with an option for this to be extended until 2023.

Network Rail has been fined £53M after it "failed to deliver" on major commuter and long-distance punctuality last year, with many thousands more late trains than there should have been. Punctuality levels were 86.9%, significantly short of the target 92%, the Office of Rail Regulation said. Major projects did far better however, with 98 out of 118 delivered early or on time.

Ferrovial/ Laing O'Rourke has been named preferred bidder for the £600M London Underground Northern Line Extension contract. Four JVs had been in the running for the scheme with those to miss out: Bam Nuttall / Balfour Beatty; Bechtel / Strabag; and a Costain /Dragados / Sir Robert McAlpine JV. Contract award is planned for August.

Network Rail has published options for improving the rail route west of Exeter following the Dawlish collapse and flooding problems in the winter. Options in the West of Exeter route resilience study are: strengthening the existing railway, alternative route on the former London & South

Western line from Exeter to Plymouth via Okehampton; constructing a double track railway on the alignment of the former Teign Valley branch line; five alternative routes for a direct line from Exeter to Newton Abbot.

Labour leader Ed Miliband has said that the party would let the public sector challenge private rail operators to take on the running of franchises. He argues it would improve services and ensure there was British competition in bids to run the country's trains.

Hong Kong business MTR has won the deal to operate Crossrail trains from 2019. MTR also operates the London Overground concession with Arriva UK Trains as well as running the metro system in Hong Kong.

HIGH SPEED RAIL

Timothy Mould QC kicked off proceedings at the High Speed Rail (London – West Midlands) Bill Select Committee this month with the opening statement on behalf of Department for Transport. He indicated that DfT would be arguing strongly against petitions for new, long tunnels through, for instance, Buckinghamshire which would not be of general benefit and would compromise performance of the railway. "We are keen to demonstrate that there is no case for spending more to achieve less," he said.

Britain needs a third east-west high speed railway line in the north of England connecting the major cities because they are "collectively not strong enough" to challenge the dominance of London, Chancellor George Osborne has said. Britain needs a "northern powerhouse" of linked cities that can "take on the world", he said. The government has asked HS2 boss Sir David Higgins to work up proposals for a high speed rail connection in the north of England.

AECOM is to buy URS Corporation in a cash and shares deal worth $6bn. The move sent shockwaves around the industry and if agreed in October the deal will create a business with 95,000 staff, annual revenues of $19bn and pretax profits of around $1.3bn. AECOM's 2013 annual revenues were $8.1bn compared to URS at $11bn. However the deal is certainly AECOM led and the firm's management will head the new executive team with AECOM chief executive Michael Burke and executive chairman John Dionisio leading the board. For many URS staff this is the second time they have been sold in the last four years after Scott Wilson which was bought by URS as part of a £230M deal in July 2010. The deal will leave AECOM with a debt to earnings ratio of 4.4 and Burke said the priority over the short term would be to reduce this debt level back to current ratio of 2.

HS2's new construction headquarters is to be Two Snowhill in Birmingham's Colmore Business District. A major fit out will be carried out ready for work to start in 22 months, with up to 1500 jobs expected to be created in the city. The move is the largest ever public sector relocation to Birmingham.

BUSINESS

Latest information on Balfour Beatty's sale of Parsons Brinckerhoff suggests the firm is considering the merits of five suitors and will have selected one to pursue for a potential marriage by the end of this month. Rumours are circulating of a circa £600M price tag.

Mouchel, which took itself off the (stock) market in 2012, and is currently owned by its banks and some management interest, has, according to reports, hired merchant bank Rothschild to advise it on its next move. This could imply that the company is considering relisting or that it has had serious offers for a trade sale. Suggestions are that the business is currently valued at £500M.

The board of French rail and energy group Alstom has unanimously voted to accept an offer from General Electric. US conglomerate GE is bidding $17bn (£10bn) for Alstom's energy business. The deal still needs regulators' and Alstom staff representatives' approval. If approved, the deal is expected to be completed in 2015.

Britain's recession was not as deep as feared and the economy has already returned to its pre-crisis strength, official growth estimates suggest. The Office for National Statistics said the drop in output in 2009 was not as deep as previously thought. Instead of shrinking 5.2%, GDP contracted by 4.1%. The figures suggest that the economy had already returned to its previous peak during the early months of 2014, economists said, slightly earlier than expectations.

Contractor BAM issued a profit warning of £60M following losses on civils jobs, one in Germany and a UK civil engineering scheme, due to adverse ground conditions. It has announced it will be introducing a major cost reduction programme to save £80M by the end of 2015.

Galliford Try has bought Miller Construction for £16.57M. Galliford said the price "represents a very attractive valuation" for the £409M turnover business which posted a £4M operating loss last year. Miller Construction chief executive Chris Webster will not be transferring as part of the deal and has left the business.

HOUSING

BRE has unveiled plans to develop a voluntary sustainability standard for new homes that will allow developers to differentiate their product in the marketplace by recognising performance beyond minimum regulation and provide increased choice for the consumer. The announcement comes in the wake of the recent Housing Standards Review (HSR) and dissolution of the Code for Sustainable Homes.

House prices in June remained positive across the UK but the Mortgage Market Review (MMR) and the BoE rhetoric are having a drag on activity, according to the RICS Residential Market Survey. UK-wide, a net balance of 53% of respondents reported an increase in prices in June (from 56% in May) and prices rose in each of the twelve areas represented.

Tesco is planning to build 4000 homes on land it had previously bought to expand its supermarkets, according to reports, following a change in shopping habits and growth in online purchases. It could build the homes itself or sell the land to property developers.

PEOPLE

Arup's Tristram Carfrae has been announced as the Institution of Structural Engineer's Gold Medal winner. Carfrae designed the Beijing Olympics Water Cube and Singapore's Helix bridge. He is part of the team for London's Green Bridge.

Steve Hollingshead, former chief executive of Laing O'Rourke in Australia, has been appointed construction director of Tidal Lagoon Power in charge of constructing Swansea Bay tidal lagoon.

Former Capita executive director Dave Spence has joined Amey as managing director of its consultancy business. Spence reports to Andy Milner, managing director of Amey's Consulting, Rail and Strategic Highways division.

Former Heathrow Airport chief executive Colin Matthews has been appointed as non-executive chairman of the Highways Agency. Matthews spent six years at BAA which was renamed as Heathrow Airport Holdings in 2012. He will take over the post of Agency chair from Alan Cook in September and be paid £130,000 for a minimum 78 days work a year

Sir Philip Dilley has been confirmed as new chairman of the Environment Agency from and takes up his role in September. "Understanding the wide breadth of all the activities of the Agency is going to take some time, and plenty of listening", he told Infrastructure Intelligence in July.

ENVIRONMENT

The air quality in some of the UK's biggest cities is unlikely to meet EU standards before 2030, according to the government. Member states were supposed to meet targets on pollutants from diesel cars and trucks by 2010. The nitrogen dioxide (NO2) they produce is linked to a range of respiratory ailments. But the European Court of Justice has heard that London Leeds and Birmingham could stil be above their goals in 2030.

Government is to beef up the numbers of ultra low emission vehicles by purchasing 150 plug in electric cars in the first wave of a new scheme, transport minister Baroness Kramer has said.

WATER

United Utilities has announced the successful bidders awarded contracts for the provision of construction and engineering services for AMP 6. The contracts, which could be extended to 2026, have been split into two categories – Construction Delivery Partners and Engineering Services Partners. The successful bidders are, for construction delivery partners, MMB (Mott MacDonald Bentley); C2V+ (CH2M Hill and VolkerStevin); Advance (Balfour Beatty and MWH); LiMA (Laing O'Rourke and Imtech, with support from Atkins). Contract for Engineering Services Partners has been awarded in full to Jacobs UK.

AND FINALLY

The Government's Infrastructure Cost Review programme has delivered 15% of cost savings amounting to £3.4bn a year on major projects. A report published by the Treasury shows better project planning, alliancing and work bundling has led to savings in the key infrastructure sectors for the third-year running. It said the potential for saving over the next ten years could add up to £50bn.

INTERVIEW: Tim O'Neill, chief executive Systra UK

Tim O'Neill took over as the new chief executive of Systra UK last month having spent the last 10 years running Atkins' rail engineering division.

What challenges do you face at Systra UK?
The real challenge is to develop the business. It is currently predominantly a transport planning consultancy but it also has a growing engineering business. The business plan is to grow both parts. The future is about developing the right relationship and my role is finding the right people who can grow those relationships.

How optimistic are you about the market?
We are in a lucky place in terms of funding. If you look at, say, electrification in the UK there is a huge opportunity and that is a starting point for us but not the only thing we want to do. It is about making sure we have the right partnerships to suit our capability.

You want to grow – how big and by when?
We now have just over 150 staff plus consultants and realistically I would say that we can get to 200 or thereabouts by 2019. But it is also about how we can partner with people. My immediate short term focus is about visibility and stability. People have to understand what my game plan is.

Is availability of skills a limiting factor in your plan?
That is more of a challenge in the rail engineering side of the business – there is a huge demand there and a huge skills gap. There are a lot of people after the same resources.

How will you resolve those resourcing issues?
We draw on resources from Systra as a whole – I have guys in Poland and India and we are looking at how we can use those teams to deliver some of our work in the UK.

Are you looking to buy?
We are looking at both organic growth and acquisition. We are looking seriously at acquisition both in the engineering and consultancy business. Plans are a little bit more well developed on the engineering side.

You worked on the Jubilee Line Extension and the West Coast Mainline – what have you learnt about controlling cost?
On Jubilee Line a lot of the cost was in the way the job was broken up and procured and we face exactly the same challenge on HS2. The way that they are currently thinking about procuring isn't based on systems engineering thinking.

Can the industry influence this issue on HS2?
The industry has to influence HS2. They have brought it Simon Kirby and Jim Crawford and these guys both understand these issues so maybe it will change .

Looking forward are your competitors likely to change?
You are always going to have competitors but we will also partner with some while going up against them. We all want to work for the same clients so there may be some consolidation and new players but I don't think that the market will be very different.

Who will your key clients be?
Contractors will increasingly be the new clients. There will also be new smaller clients but the big opportunity will still be around the big clients and big projects.

Sir John Armitt, chair, City and Guilds

An Independent Infrastructure Commission is key to ensuring cross party political support

A draft bill and explanatory notes to enable a future Government to, if it wished, take forward this plan has been published for comment.
Visit www.armittreview.org for details. Consultation closes on 31 October 2014

In the UK today you might think we are relatively well off in terms of infrastructure provision but a World Economic Forum survey still rates us 28th. In part we still benefit from the legacy of our Victorian forebears but it cannot last forever.

If we are to compete on the world stage, grow our economy and provide the infrastructure our grand children deserve we must plan today for the long term.

The plans must be based on considered evidence and have public and cross party support. For too long we have had a short term expedient approach with too many changes of priorities. It is not good enough. We cannot pull the covers over our heads and assume the challenges will go away.

Bad infrastructure is bad for people, bad for business, bad for our future.

Long term strategy enables government, business, investors and educators to plan with confidence.

Since the launch last September of my Review and proposal for an Independent Infrastructure Commission I have consulted widely and encountered much support.

An Independent Infrastructure Commission, created by statute, its Chair appointed by the PM would be charged with producing a 30 year assessment of our infrastructure needs. The public, politicians, sector organisations and campaign groups would be consulted on those needs.

The conclusions would be passed to the Chancellor who would be obliged to lay them before parliament for debate and approval. So we would have an act of parliament which defined our needs.

Relevant Secretaries of State would produce Sector Infrastructure Plans to meet those long term needs and consultation would be required before plans were laid before Parliament for debate and approval. The whole process would be repeated every decade.

The Commission in addition to its work identifying future needs would review the sector plans, publish its view and report regularly to parliament.

Some people have interpreted my proposal as taking politics out of infrastructure. Nothing could be further from my intention. You cannot take politics out of infrastructure. It is best delivered with cross party support and consistent leadership. The Olympics was a great example.

This proposal seeks to engage the public and politicians from the outset when identifying the country's needs and help them to make good decisions for the benefit of the country.

Isabel Dedring, Deputy Mayor of London for Transport

Planning for 2050

London is among the most competitive global cities in the world. We now contribute more to the UK economy than ever before and it is the city the world wants to live, work and do business in. As a result our population is set to reach record levels and is forecast to keep rising. We expect another million people in London by 2021, to reach 10 million residents by the 2030s and possibly over 11 million by 2050.

That incredible growth is why we have now produced our first ever long term infrastructure investment plan, which sets out an agenda for London in the 21st century. We already know we are going to need around 50,000 new homes and 45,000 jobs every year. But there is a huge amount of work to be done to deliver the infrastructure that will keep this city the envy of the world.

Our transport system is at full capacity; our water is supplied through leaking Georgian and Victorian pipes; energy demand is set to outstrip supply in the very near future and we need to improve our quality of life with more and better green spaces, cleaner air, and good schools to prepare our young people for the jobs that are there for the taking.

That is why we need to start planning now for London's long term continued success. We are consulting on a long term infrastructure investment plan that sets out the high level infrastructure requirements to 2050, how much that will cost and how we might pay for it all.

We ask how we can ensure Green infrastructure becomes considered as much a part of the city's vital system as our other utilities. We talk about transport and the need to finish modernising the Tube, plus the need to begin work on Crossrail 2 now and start considering the case for Crossrail 3 and 4. We talk about new regulatory frameworks and improved ways of delivery infrastructure.

Above all we try to set out what we need for London to remain a world leading city that not only benefits Londoners but the entire country.

It is time for the political and business leaders of this great city to develop and deliver a sustainable long term plan for London. A plan that ensures London's unique status is reflected in national plans and regulations, and that puts this great city firmly in control of its own infrastructure, funds and future.

Nelson Ogunshakin, chief executive, ACE

A view from down under

ACE's fifth European CEO Conference & Awards is scheduled to be held in London on 18 and 19 November 2014.
For details visit www.acenet.co.uk

One of the privileges of being ACE chief executive is the opportunity to travel to support our sister organisations. Last month I accepted the invitation from Consult Australia to assist with the Asia Pacific region's CEO Conference. The gathering of 45 CEOs provided insight into the challenges facing their markets and how they are being tackled.

There are positive signs of modest growth although this is below the days of the big boom with profit margins tight. The engine for expansion has been boosted by the welcome pension fund investment into major capital projects, with the mining and extractive sector predicted to be the biggest growth area in the future.

One of the most interesting and dramatic issues we discussed was the current wave of consolidation and new entrants into the industry, and the increased visibility of the Chinese and the new capital flow they have introduced. The two year lull in the market has also created opportunities for mergers and acquisitions.

We will see the continuation of US based companies expanding globally such as AECOM's recent acquisition of URS which sent shock waves through the industry. At the conference 98% of the CEOs agreed that diversification encourages consolidation and can achieve market efficiency and competitive advantage.

I was interested to observe that CEOs measured M&A success through cultural fit and retention of strategic staff, with CFOs concerned about the valuation and price paid for the asset.

My trip to Australasia provided a good insight into the global challenges and opportunities. Established players will continue to leverage on the growing market sector. Forging strategic partnership with companies in the Northern Hemisphere will become more pronounced.

Companies will focus on wider regional markets such as China, Hong Kong, Indonesia and Singapore, rather than domestically in Australia or New Zealand. Increased market consolidation will generate regional critical mass and affect more M&As. The only area of concern I noted is the potential lack of transparency at the political level.

The challenge for ACE is to continue to be innovative and creative on how it serves its UK membership and leads the global industry.

International experiences helps keep ACE fresh and open minded to change and maintains our position at the forefront of thought leadership.

Steve Capel-Davies, partner, Peter Brett Associates LLP

UTCs – A New Route into Engineering

Getting young people into engineering continues to be a challenge. Many firms successfully promote STEM subjects but, despite their efforts, not enough young people know about our profession.

So in addition to our wok in schools and with apprentices, Peter Brett Associates (PBA) is now involved with another initiative: the University Technical College or UTC. And it is beginning to be really successful.

The idea, which comes from the Baker Dearing Educational Trust, aims to meet the STEM needs of local businesses. Formed in association with a local university and businesses, UTCs are colleges for 14 to 18 year olds that pay specific attention to target topics. These vary between UTCs and include science, IT and, importantly for PBA, engineering. There are many benefits:

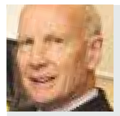
- Local businesses can help to shape the UTC's new engineers/ technicians
- Students will have knowledge of the industry before starting work
- Students and businesses can get to know each other before employment
- Existing staff gain valuable experience working with students and tutors.

At UTC Reading, PBA, along with three other main sponsors have helped devise the curriculum and bring in the first students. Our involvement includes holding joint events, giving topical talks and, this year, setting a real design project. We helped run the project as a competition with our own staff acting as mentors. We judged the results and the finalists were inspiring - some are already starting summer placements.

Seventeen UTCs are open and a further 30 planned by 2016 – so it's a good time to find out what's near you. The UTC approach is inspirational; it relies on local businesses to help shape the specialisations. Those businesses who take part can choose to get involved in a variety of ways which don't have to take up much time or cost anything.

Additionally, PBA is involved with the Thames Valley Berkshire Local Enterprise Partnership. The LEP has recently received significant funding to promote STEM subjects, support apprenticeships and build Solution Labs – all of which will support new routes into careers in engineering and science.

There are lots of local initiatives that will benefit our profession. But they need support from businesses to succeed. So get involved!



Professor Robert Mair, head of civil engineering and the Centre for Smart Infrastructure and Construction, University of Cambridge

Transforming construction and management of infrastructure is integral to future economic success

High-quality infrastructure is essential for supporting economic growth and productivity. It attracts globally-mobile businesses and promotes social well-being

Modern infrastructure must be robust, resilient and adaptable. It needs to be optimised in terms of efficiency, cost, carbon footprint and quality.

There is a compelling need for change. The UK construction industry is seen as expensive, often late and of mixed quality, at odds with 'new and fast' technology sectors, having a fragmented supply chain and being resistant to innovation.

There are real opportunities for new technologies to make radical changes to the construction and management of infrastructure, leading to considerably enhanced efficiencies, economies, resilience and adaptability.

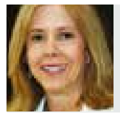
The industry can benefit from emerging technologies in sensor and data management such as fibre optics, Micro Electro Mechanical Systems, computer vision, power harvesting, radio frequency identification and wireless sensor networks.

The Cambridge Centre for Smart Infrastructure and Construction (CSIC) has been active on more than 40 construction sites in the UK. On the Crossrail project, working with the Knowledge Transfer Partnership (KTP) Associates, it has been involved on four sites, principally with fibre optic sensing to measure the performance of shafts and deep excavations. A novel wireless sensor network is also installed in the excavation for Paddington Station.

The monitoring data has provided new insights into the behaviour of the shaft lining and ground movements adjacent to the shaft during construction. It highlighted the generally conservative nature of the designs – with only very small wall strains and deflections being recorded. It has also shown much smaller ground movements than predicted.

CSIC has successfully installed optical fibre sensors on the diaphragm wall reinforcement cages at the Crossrail sites and robust installation techniques for achieving reliable measurements have been developed. This work has important implications for industry.

The Crossrail work has demonstrated the potential economic benefits that could be achieved. Rationalisation of the design approach will benefit the wider construction industry. A more efficient design approach should result in reduced amounts of material used and a faster construction. Such innovations will transform the construction and management of infrastructure and enhance and help sustain our future.



Sarah McCann Bartlett, BCSA chief executive

CE Marking of construction products – we're all in this together

The construction industry faced one of its most significant challenges for a decade when CE Marking of construction products became a legal requirement in all European Member States.

The Construction Products Regulation (CPR) came into force on 1 July 2013 and overnight made it a criminal offence to supply hundreds of steel, concrete, timber and masonry construction products without a CE Marking.

CE Marking of structural steelwork came into force on 1 July 2014.

One of government's criticisms of the sector is that it doesn't speak with one voice. While I believe we're seeing signs of change there is still a long way to go. With more European law coming into force in the UK, the government and industry must work together to ensure the industry is not disadvantaged.

A number of trade associations such as the British Constructional Steelwork Association (BCSA) have spent considerable time and money helping their members comply with the CPR, as well as educating the wider supply chain. BCSA has also made CE Marking compliance a condition of membership.

One year on from the introduction of the CPR, and there is stil confusion over which products are covered. It is also unclear whether other materials and product suppliers are as qualified as the structural steelwork supply chain.

But the use of non-CE Marked products will have serious consequences and may invalidate insurance and warranties. All clients and contractors should routinely ensure that they specify only CE Marked construction products by an accredited notified body.

When a client or contractor imports construction products directly from outside Europe, they will become an importer and must meet the obligations placed on importers by the CPR.

Under some conditions contractors or clients may be regarded as distributors under the CPR and so must comply with the legal obligations for distributors.

Compliance with CE Marking is undoubtedly a legal issue. But it's also a health & safety issue, an insurance issue and a reputational issue. This may be a regulation emanating from Europe, but the construction sector cannot ignore it – we're all in this together.

Further information on CE Marking is available at ***www.steelconstruction.info/CE_marking***

Alistair Lenczner, independent consultant

Cross-Country high speed services could boost HS2's value to the whole UK

It's not fashionable to suggest the South is losing out to the North when it comes to new railways in the UK, however in the case of HS2 this indeed can be argued where, London aside, the south is being unnecessarily ignored by planners.

HS2's economic benefits could and should be shared by more of the UK south of Birmingham and in doing so would give better value to UK taxpayers.

Maps published by HS2 that show that there will be 20 or more towns and cities in the Midlands and North UK served by direct trains. South of Birmingham it is just London.

The use of Cross-Country type train services between South West England/South Wales and the North West/North East to use HS2 does not appear to have figured in thinking.

David Higgins's recent *HS2Plus* report emphasized the importance of maximizing the opportunities for the project. He rightly recognizes the importance of integrating with the existing rail network to maximize connectivity. So far, there seems to be a blind spot south of Birmingham.

HS2's poor connectivity at Birmingham is a case in point. Current HS2 plans place the new Curzon Street terminus station an inconvenient 15 minute walk from the existing rail hub at New Street Station and does not allow for through running of trains between the existing network and the new HS2. This goes against Higgins' stated connectivity aim and misses an opportunity to get more value from lines north of Birmingham.

A relatively simple change would introduce a chord connecting New Street's existing eastern approach lines to the new HS2 line where it enters Curzon Street station. This would allow shorter Cross-Country high speed trains from Cardiff and Bristol to continue high speed to Manchester and Leeds. Such a chord would represent a very small cost in the context of the project but would allow significantly more of the UK to share the benefits of HS2.

As well as reducing journey times this would make use of spare line capacity on these branches. Thus, not only will more passengers benefit from HS2, the project itself would also be seen to offer better value for money.

Given that HS2 has still several hurdles to clear before it gets a final political go ahead, its promoters should be looking at every opportunity to maximize its value to the UK. In this context, the introduction of Cross-Country high speed trains onto HS2 would appear to be an easy opportunity that should not be missed.

Ben Mullard, associate, Beale & Company

Overseas opportunities must be approached with "eyes open"

We are seeing increasing opportunities for UK consultants and contractors looking to work overseas, particularly in the Middle East and Africa. These new opportunities bring many potential benefits, but parties need to ensure they approach them 'eyes open'.

Overseas contracts can be more onerous than those typically found in the UK. Obligations often extend further than clients commonly accept back home. In addition, many provisions which are typically regarded as "market standard" in the UK, such as limits on liability, are often resisted by clients.

A particular issue for both consultants and contractors is their exposure to some form of decennial liability. The nature of the liability varies between jurisdiction, but in general terms provides for contractors and consultants to be jointly liable for the building or structure for a period of 10 years following completion.

Decennial liability operates as a strict liability; the client does not need to prove negligence and contractors and consultants will be liable even where the client consented to the defective construction or the defect or collapse results from outside causes.

In addition, parties are likely to have much more limited options to enforce payment obligations. For example, there is no statutory protection as in the UK under the Construction Act and "pay when paid" clauses are commonly included in agreements.

Local legal systems differ between jurisdictions and are typically very different from that familiar in the UK. Resolving disputes in local courts is therefore likely to be difficult. For example, some Middle Eastern jurisdictions offer no system of judicial precedent.

It is therefore generally preferable for contracts to provide an appropriate dispute resolution procedure outside the local court system, typically in the form of arbitration in accordance with internationally recognised rules, such as those published by the ICC.

That said, there remain many attractions to working overseas. Provided you are prepared to manage these risks they will be well placed to take advantage of these opportunities.

Winning the LEP funding game

Leeds was the big winner of the Growth Deal settlements with Local Enterprise Partnerships last month. *Antony Oliver* talks to Leeds City Region LEP board member and WYG chief executive *Paul Hamer* about the secrets of the success.

Leeds City Region LEP secured a whopping £573M from the Government's latest Local Growth Fund allocation to support economic growth in the area over the next six years.

In total the overall LEP settlements amount to some £2bn a year and will be rolled out over the next six years bringing the total committed support devolved to the 39 Local Enterprise Partnerships to spend on homes, transport and skills projects across England regions to £12bn.

In Leeds the settlement includes
- £62M of new funding confirmed for 2015/16,
- £233.3M for 2016/17 to 2021 to add to the
- £277M previously committed as part of Local Growth Deal funding for the area

It will also bring forward at least £340M of additional investment from local partners and the private sector to create a total new investment package of £912M for the Leeds City Region area.

The Growth Deal will bring together local, national and private funding as well as new freedoms and flexibilities to focus on three key priority areas as identified in the LEP's Strategic Economic Plan:
- Improving transport connectivity,
- accelerating housing growth and town centre regeneration
- developing a skilled and flexible workforce

By 2021, the LEP expects that at least 8,000 jobs will be created and allow 1,000 homes to be built.

Leeds City Region has secured £573M from the Local Growth Fund. Why do you think the bid was so successful?
When we first set up the LEP we all saw a region that was already making a huge contribution but that was still relatively unknown and yet to fulfil its potential. We developed a proposal that showed strategic ambition but with an ability to deliver. One of the benefits of strong

Paul Hamer

private leadership is that we have run the LEP with private sector influences – it is output based and that has allowed us to succeed.

Was everything in you strategy approved?
No. We didn't get everything that we asked for. You have to be realistic about the pressure that continues on the public purse. So we have prioritised the deal that got done. Some of our projects are already in place but there are many other areas where we will be thinking about switching resources.

Clearly having the HS2 project on the horizon help your strategy. Was that key to success?
There is a very clear ambition by government to rebalance the economy and the HS2 project and LEPs now make the policies join up. It is accepted that the north can make a bigger contribution to national economic growth. This strategy will help that.

How do you engage the private sector?
The key objectives are gross value added growth, new employment and making the region a great place to work. We asked what projects would allow us to move forward most quickly and how could we get major private sector investment. The Energy Hub project is a great example – without the funds to progress the project it just sat on paper as an idea.

How important is this settlement to local SMEs in the regions and businesses such as WYG?
WYG has been in Leeds for 50 years and certainly this LEP settlement should be good for business. But while I sit on the LEP panel I do so to help the LEP not to win work for WYG per se. But a considerable amount of money must find its way into local SMEs. As a LEP we must engage with and promote the local supply chain. We must create commercial visibility around the opportunities because that is where the greatest benefit will come to the region.

Key projects

West Yorkshire Plus Transport Fund: Significant investments in inter-city and intra-city connectivity schemes.
Skills capital programme: Investment in further education colleges and training providers that will support sectors which are likely to generate the largest contribution to economic growth.
Business Growth Programme: Funding that will provide for capital grants for businesses.
Energy Hub: Specialist vehicle responsible for the development of a pipeline of new energy projects
Resource smart business support: tailored support to small and medium sized enterprises to reduce resource costs and increase productivity and competitiveness.
One City Park: Bradford: Transformation of Bradford city centre
East Leeds extension: strategic development for housing growth.
City Fields, Wakefield: strategic development for housing growth.
York Central: Regeneration site that will accommodate housing, office, retail and leisure within a 1M sq ft urban extension
Halifax Town Centre: Part of the wider Halifax Town Centre renaissance plan.
BioVale, York: Innovation cluster for biotechnology.
Horse Close, Craven: A key site for employment and housing in Skipton.

Climate Positive

Urban laboratories seeking new models for sustainable living

Antony Oliver reports on the move to carbon negative cities.

In 2009 the Clinton Climate Initiative and C40 launched the Climate Positive Development Programme (CPDP).

The idea is to shift focus from encouraging low carbon performance across individual infrastructure elements to an assessment of the overall impact of wider developments and on the communities they serve.

By focusing on specific developments within key global cities, the aim is to create models for large-scale urban communities that reduce greenhouse gasses but also serve as so-called "urban laboratories" to find practical solutions for other cities to copy.

"To really create a sustainable model you need to think beyond the development to the surrounding community," explains Zachary Tofias, head of sustainable communities for the C40 Cities Climate Leadership Group

"The goal is to be net carbon negative to create a reduction in the carbon demand across the surrounding community," he adds, pointing out that the climate positive outcome is achieved by reducing emissions on-site and offsetting emissions in the surrounding community. "It is a new paradigm for development where you are pushing the low carbon and sustainable impact out into the community."

Tofias is very clear that offsetting means investing in the local communities. This is not a way to "cheat" true sustainable development.

"Offsetting for us is about investment in the community, not simply planting trees," he explains. "Success is the sharing of information and strategy. It is about developers showing that they can engage with the community and so showing a tangible net reduction in emissions."

The CPDP fits into the broader C40 Cities Climate Leadership Group – a network of 63 large and engaged cities from around the world committed to implementing meaningful and sustainable climate-related policies.

The programme hopes to identify and support exemplar developments within major global cities that can be used to drive and share ideas across the rest of the wider C40 network and beyond.

So far there are 18 projects in the programme across six continents, all of which are carefully chosen and assessed to ensure that they provide a good geographic range. In the UK, London's Elephant and Castle development by Lend Lease is one of three by Lend Lease on the programme.

By contrast to this London example, the programme also includes projects such as the Parque da Cidade development in São Paulo, Brazil which, while of course an urban development with housing, office space, waste, energy and transport needs, has a completely different hierarchy of need.

Yet despite the reality that each development in each city has unique challenges, Tofias is adamant that much can be learnt across continents

"There is a huge amount of commonality between cities around the world," he says. "Buildings are buildings – they may need heating or more air conditioning but because we are looking holistically you can share knowledge. Not necessarily one-for-one but all around the world there are different lessons to be learnt."

For Tofias, it is also critical that each development has a sufficient mix of aspiration and deliverability to demonstrate net carbon negative performance across energy, waste and transportation infrastructure.

"The most surprising thing is how enthusiastic each of the developers have been towards the project,' he says. "We hear a lot about the adversarial nature of the industry – I really don't know it on this project."

To be accepted on the programme developers have to clear a four stage process which begins with setting out goals and tactics to achieve carbon negative outcomes and which is then scrutinised by a panel of experts to verify that the road maps are credible.

> "We are working with far sighted developers, bringing the developments and the city authorities together to ensure lessons are learnt"
>
> **Zachary Tofias, C40**

Once accepted as a participant on the programme, the projects have to demonstrate their adherence to the road map and earn credits through progress towards climate positive outcomes.

"The projects are all striving to create locally relevant solutions," explains Tofias. "We are working with far sighted developers, bringing the developments and the city authorities together to ensure lessons are learnt."

In the case of Elephant and Castle developer Lend Lease is working with the local authority Southwark to think how they can all benefit from the climate positive scheme.

Lend Lease is also involved in development in Barangaroo, Sydney and Victoria Harbour, Melbourne in Australia, enabling the firm to share information even more easily across their networks.

"Most of the developers that are involved do it because they see that this is the direction of travel. Cities get involved because they cannot afford to pay for all the development,' Tofias says. "Developers appreciate the exclusivity of the project – it is not open to all."

Right now the project is being kept deliberately small, limiting the number of projects in the laboratory to 18 so as to enable the C40 team to focus effort and learning.

"At some point we will be looking to increase the number but not just yet," explains Tofias. "So far five projects have approved road maps and a number that are very close to achieving theirs. Success is for the projects to have value from collaboration and create a new model of development."

Zachary Tofias, C40

Accepted projects

1. Barangaroo South, Sydney, Australia;
2. Victoria Harbour, Melbourne;
3. The Oberlin Project, Oberlin, OH, USA;
4. Elephant & Castle, London, UK; and
5. ProjectZero, Sonderborg, Denmark.

Candidate projects

1. Parque da Cidade, São Paulo, Brazil;
2. Pedra Branca Sustainable Urbanism, Palhoça, Greater Florianópolis, Brazil;
3. Dockside Green, Victoria, Canada;
4. Waterfront Toronto, Lower Don Lands, Toronto, ON, Canada;
5. Nordhavn, Copenhagen, Denmark;
6. Godrej Garden City, Ahmedabad, India;
7. Mahindra World City, Jaipur, India;
8. Menlyn Maine, Pretoria, South Africa;
9. Magok Urban Development Project, Seoul, South Korea;
10. Stockholm Royal Seaport, Stockholm, Sweden;
11. Royal Albert Basin, London, UK;
12. Treasure Island Development Project, San Francisco, CA, USA; and
13. South Waterfront EcoDistricts, Portland, OR, USA

LONDON

Elephant and Castle

Developer Lend Lease is working with Southwark Council to transform the traffic congested and run down Elephant & Castle area in south east London with a £1.5bn regeneration project.

Over the next ten years, the plan will see nearly 3,000 new homes built with more than 50 new shops and restaurants emerge following demolition of the huge concrete shopping centre – the first covered mall in Europe when opened in 1965 – and will include central London's largest new park for over 70 years.

Lend Lease has set out to embed low carbon designs to create a sustainable community that creates over 6,000 new jobs, invests £30M in transport improvements and £1.5M in local schools.

Across the elements of the project such as the construction of new homes, transport infrastructure, business improvement and green spaces, it has identified the so called "Elephant Effect" to create a truly sustainable and forward thinking community as part of delivering its Carbon Positive Development Programme.

> "The energy efficiency measures we're introducing in all of our homes will ensure that future residents will face much cheaper utility bills than the average home today."
>
> **Elephant Effect**

The Elephant Effect, explains Lend Lease, is about creating an opportunity to transform thinking about urban redevelopment and what it can achieve – not only on a local scale, but on a global one.

Transport

- Over £30M towards strategic transport improvements at E&C, including Northern Roundabout and Northern Line Ticket Hall improvements, and an extension of the Cycle Hire scheme
- Vastly improved pedestrian access including four new pedestrian crossings across existing major roads
- Provision of two new cycle routes between the New Kent Road and Walworth Road
- Provision of up to 19 new ZipCar club spaces (subject to demand) including 3 years free membership for new residents
- Over 3,000 cycle parking spaces
- 20% of car parking spaces provided on our development will be fitted with electrical charging points

Business

- Over £42M per year of additional household spend
- Over £600,000 per year in local spend by employees during construction
- Over £1M per year in additional local spend by workers employed in the completed developments

Homes

Nearly 3000 home delivered to the highest standards

- All homes will be built to Level 4 of the Code for Sustainable Homes as a minimum.
- Efficient building design and technology will improve insulation and air circulation – leading to 50 per cent energy savings for residents.
- All homes will maximise healthy living with a strong focus on natural light and fresh air.
- At least 50% of stormwater will be retained on site through sustainable urban drainage systems including extensive green roofs. Harvesting of rainwater will allow for the irrigation of gardens in the developments.
- The entire development will be constructed with 100% controlled, responsibly sourced FSC timber.
- All homes will be compliant with Lifetime Homes standards, which ensure our homes will support the changing needs of individuals and families at different stages of life.

Green spaces

- Central London's largest new park in 70 years
- Up to 30,000 sqft of new publically accessible playspace, plus £300,000 contribution to upgrade nearby sports facilities
- Five new public squares
- Two new pocket parks
- New community garden
- Provision of 10 new routes through the developments in addition to existing routes
- Street lighting, street furniture, signage, and opportunities for public art
- Over 1200 new trees planted in the surrounding streets, parks, schools and estates.

High rise gardens will contribute to Elephant & Castle's new look and feel.

INTERVIEW: Jon Kirkpatrick, sustainability director, Lend Lease. Interview by *Antony Oliver*

With 70% of the global population expected to be living in cities by 2050, are we heading for a crisis?

Well I think we have to see it as an opportunity. Often the best opportunities come out of crisis and threat – to capitalise on it you really have to see it that way and I think that the entire industry will have to see it that way.

Are we now embracing sustainable design ideas?

I think that as an industry we may have got a bit caught up in ourselves. We talk about sustainability and energy efficiency and we miss the bigger picture. And the bigger picture is understanding that people are the end users and will be living in these homes or working in these offices – so why are we designing offices for offices sake or homes for homes sake? Why are we not looking at the end user and asking 'how do you want to live your life, how do you want to utilise this office space to work?' We should be shaping our designs around what people want. If you don't then you will miss the mark."

What is so special about your Elephant and Castle project in South London?

Elephant and Castle is a great example – it is in zone 1 London with fantastic transport connections and with tube lines, rail and cycle networks it is one of the most connected spaces in London. That means that you can live there work there and still be central London in ten minutes. So it is about having all those things together.

Is it easier to effect culture change on smaller projects?

Big urban regeneration projects provide more opportunities to make a difference. They bring problems with many stakeholders to keep happy but I do think that you have more opportunity to make a difference.

Are clients getting better at embracing sustainable solutions?

I am quite lucky in that as a company Lend Lease is quite often its own client – so if we get the brief wrong then it's our own fault. Projects like Elephant and Castle are about moving away from business as usual. Right now the industry is looking at reducing carbon and reducing impacts but in reality we need to go beyond that – getting to zero is not enough – we are at the point where we need to talk about positivity. What can a project do to have a positive impact on the projects around it? Not just within its own boundaries."

Does government have a role to drive low carbon design?

The world is changing – yes governments have a role to play but we are no longer in a scenario where we can rely on government to make these decisions for us. The younger generations are far smarter and switched on than we are and they are catching up. We have an interesting perfect storm of government and clients on one side trying to do the right thing and a younger generation with great expectation.

Is there enough engagement on the need for action over climate change?

We cannot put our heads in the sand. You are either on the train or not – and you have to be on the train. While there are some big challenges we have an opportunity to make something positive out of a negative trajectory.

See video interview at www.infrastructure-intelligence.com/kirkpatrick

ACO ON AIR

SÃO PAULO

Parque da Cidade

The project by developer Odebrecht Real Estate Developments will create the Tower Office Park City, a new mixed development with over 62,000m² of green parkland and open to the public.

It is described by the developer as the perfect example of "how the economy and sustainability can go hand in hand".

Creating a sustainable footprint across the development is a cornerstones of the City Park project and clearly critical to its place on the C40 Climate Positive Development Programme.

Initiatives such as selective rubbish collection, reuse of rainwater systems and other sustainable ideas are built in the project as economically viable and ecologically sustainable parts of the development plan.

The main tower will have 36 floors of flexible space to suit different sizes of companies, with quality infrastructure such as smart elevators, CCTV infrastructure, and an interactive building management system linking all the buildings in the development to monitor power and water consumption water.

Rainwater release and 62,000m² of parkland are critical to creating the right environment to change the city.

How to fill the energy gap

The electricity market is not operating as effectively as it could but there are ways to improve it. ACE's policy manager *Peter Campbell* and senior economist *Graham Pontin* outline the solutions and economics in ACE's seminal Electricity Market Reform report launched this month.

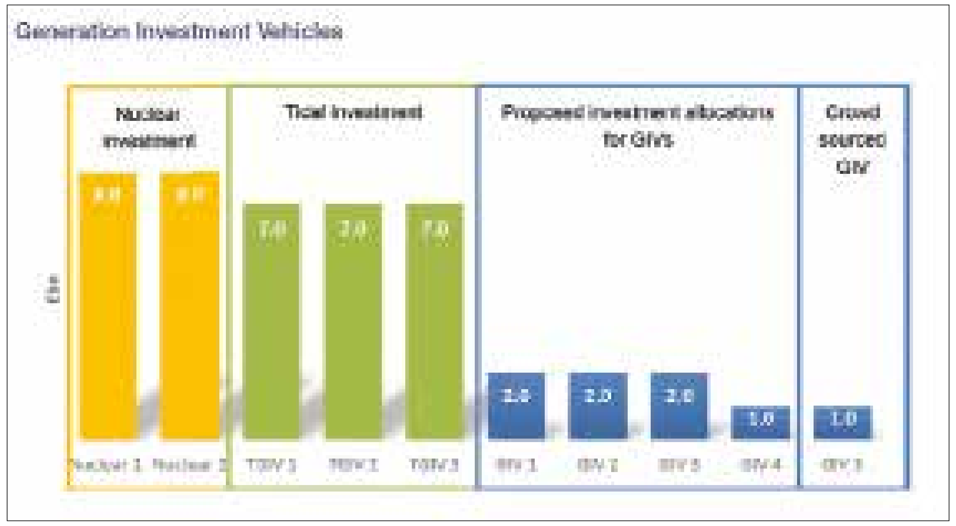
In policy terms, the UK's energy market currently sits on the horns of a trilemma between the need to secure future supply through replacement of aging, and additional, generation capacity, the desire to ensure consumer costs are kept competitive through a competitive market, and the sustainability obligations that the government has set itself.

The data presented in the accompanying piece, which appears in ACE's report, *Electricity Market Reform: Generating Results*, suggests that current arrangements might not be providing the best environment and certainty that investors require to come forward. With the 2013 National Infrastructure Plan estimating that £100bn is required to finance new generation, the supply chain to win contracts to provide work, and the electricity companies keen to re-establish a trusting relationship, the right environment is in everyone's interest.

Our research proposes a solution comprising two parts. Firstly, the government should create five Generation Investment Vehicles (GIVs) to complement its Electricity Market Reforms, aiming to raise £8bn in total. These GIVs would ensure the spread of risk that investors need to bring forward much needed capital to secure the UK's energy supply.

As an example, the £8bn of GIVs outlined in the research could be used to finance a combination of projects such as:

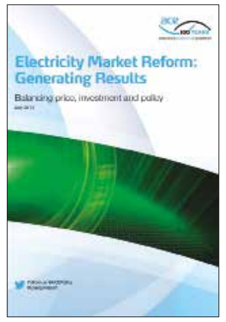
- Six Combined Cycle Gas Turbine plants at an approximate cost of £3bn (providing approx. 7,500MW);
- Eight 'waste-to-energy' plants at an approximate cost of £4bn (providing approx. 575MW);
- A £1bn fund for community projects, where money would be raised via crowd sourced funding.



Secondly, electricity generated by these GIVs would be sold through a two-stage Priority Auction Mechanism (PAM), at least 12 months in advance. This would provide the much needed transparency and benchmark price within the market to encourage stability and further long term trading, as well as stimulate further competition in the electricity generation market. Additionally, the PAM would ensure an attractive and steady revenue stream that would give investors good returns on their investment.

These are the two missing pieces of the jigsaw that will ensure the government's Electricity Market Reforms will be a success. They would also satisfy the current suggestion by the Labour party that some form of pooling of energy generation will be undertaken by a future government.

Over the coming months, ACE will be feeding the findings of this report into political parties of all colours, officials, and other organisations in the hope of building some momentum behind the proposals. We hope they will see that through the GIVs and PAM we propose, investment will come forward, consumers will see the real benefits of competition, generators and suppliers will see their standing improve, and the construction sector will be able to get on and build. Without them, more drastic measures might be needed in the future to prevent the lights from going off. **PC**



You can download ACE report at www.acenet.co.uk/energyreport

Data that shows electricity market needs reform

ACE's new report Electricity Market Reform: Generating Results, analyses the figures behind the sector in great detail. Here is a round up of some of the findings.

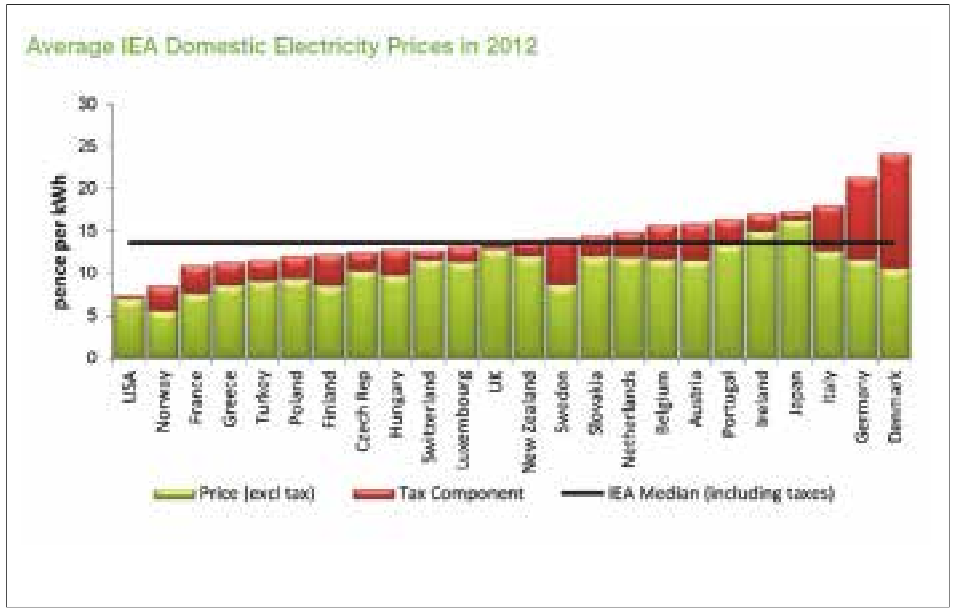
Underpinning the work ACE does is a desire to ensure it is built on a solid foundation of data analysis. To that end, and as the energy sector is a particularly sensitive topic at this time, it was more crucial than usual that our assertions were based on rigorous research. What we found was that the market was not functioning as well as it could be.

We began by examining average household fuel bills and saw that they had risen from £1,057 in 2011 to £1,232 in 2012 and hit £1,357 in 2013. These rises have been against a backdrop of low wage rate growth, employment uncertainty, and a general lack of consumer confidence, fuelling affordability concerns. Almost half (47%) of this latter figure was down to wholesale costs, while network costs accounted for 22%, with the remainder made up of environmental and social obligations (7%), supplier pre-tax profits (7%), and VAT (5%).

Switching between suppliers and tariffs is often presented as the solution to this, with direct debit customers seeing their gas bills £72 lower than standard tariff payers since 1998. Knowledge of the ability to switch is also high, more than 80% of consumers aware they can both switch suppliers AND switch to another tariff offered by their existing supplier. Almost two-thirds of consumers cannot recall doing so, however, mainly because they are happy with their supplier or feel the financial gain is not worth the time it would take to switch.

The data also indicates that there has been a shift towards more short-term 'spot' trading in recent years, with almost 40% of baseload, 90% of off-peak, and 60% of peak volumes being traded on this basis. This leaves consumers potentially at the mercy of day-to-day volatility when it comes to the price of their fuel, while also producing an environment in which energy companies are less able to take a forward view of future needs and invest accordingly.

Comparing the UK's positions with domestic markets in the rest of the world was also revealing, indicating that on the whole the UK sits right at the International Energy Agency's median, while also being the country with the second-lowest electricity taxes. This suggests that electricity in the UK might not be as over-priced as feared, but also that we are not proactive enough in reallocating resources from markets that are inefficiently accounting for the effects of climate change, pollution, and price volatility.



In addition, the data also shows us that for every 1p per kWh increase in taxation, there is an additional accompanying rise in the pure electricity price. In the UK this amounts to 7.4p per kWh, while the average rise across all countries is 0.53p. Indeed, the next highest rise is seen in Ireland, where prices rise by 4.3p per kWh for each 1p per kWh rise in taxes.

This is often a trade off by governments around the world, who use higher taxes to finance investment in new technologies and generation capacity. Over time, as the funding or long term purchase costs of these fall, so does the additional cost incurred on energy bills as a result of the investment. Essentially, as increased investment takes place the effect on electricity bills of increasing levels of taxation should decline over time.

All of this indicates that the electricity generation and supply market in the UK is not operating at its optimum. Investment is not coming forward as the incentives are not sufficient, consumers are subject to too much volatility, and the sector's supply chain is unable to develop. All the while the prospect of future power supply shortages looms. Something must be done. **GP**

How the Priority Auction Mechanism would work

The purpose of the PAM is to provide certainty for how competition should be managed going forward, whilst also clearly showing how it integrates with existing regiemes such as 'Contracts for Difference' and the new Generation Investment Vehicles and baseload providers who are economically essential or in the early technology stages.

The competition levels would operate as open exchanges where purchase of 50% and 75%, respectively, and the capacity put forward would be guaranteed on contracts of at least 24 and 12 months. All remaining and existing capacity would then have to compete 'over the counter' on a short term basis.

The establishment of two exchange markets would help to establish a clear and transparent reference price over time, as well as provide GIVs and CfD providers with certainty through guarantees of selling their capacity.

Additionally, this trading system would build on top of the generators' capacity that is locked in through baseload and technology benefits, and allow the flexible generators within the GIVs to enter markets where this is a significant chance of selling capacity. Only if a GIV were to price itself at unrealistic levels would it not sell any capacity until it hit the OTC market.

Forth at fifty

Britain's first long span suspension bridge and its first cable stay bridge are 50 this year. Mott MacDonald was designer of both and some of its engineers, past and present, talked to Infrastructure Intelligence about the significance of the structures.

Forth Bridge Facts
The main span is 1,006m long, flanked by side spans of 408.5m. The two steel girder pylon towers rise to a height of 156m above mean tide level. Approaches are carried on reinforced concrete arched pylons. Main suspension cables were spun from 11,618 galvanised high tensile steel wires each of 5mm diameter. The catenary has a sag-to-span ratio of 1 in 11. Ends of the cables were secured by massive concrete anchorages excavated into bedrock on either bank. Hangers supporting the deck were made from wrapped wires. The deck itself consists of a steel lattice truss carrying steel orthotropic dual two-lane carriageways, 7.3m wide.

In September there is a big party planned for the Forth road bridge in Scotland as it reaches its half century.

As the country's first long span suspension bridge it is a highly significant structure. With echoes of now, the decision to build it was taken by Harold Macmillan's Conservative government as one of a tranche of infrastructure projects intended to boost the economy. The country was going into a period of growth following post second world war austerity and bridging Britain's great rivers and estuaries was vital for the movement of goods, people and ideas.

Forth was a priority – in the face of rapidly growing road transport, a ferry crossing that had been in existence from early medieval times was not going to do the job for the future.

There had been plans for a suspension bridge since the 1930s with the project held up by the Second World War. In 1958 the go button was pressed and an impressive six years later the iconic road bridge was opened just a kilometer down river from the equally iconic rail bridge.

A structure of that scale and design had been untried in the UK. To erect it in just six years would be a remarkable achievement even now. What makes the achievement even more remarkable is that it was done without computer analysis, and using hand calculations.

"A suspension bridge was at that time the only choice for spans of that size and height. We had been watching suspension bridges develop in the US and were keen to get involved and be at the cutting edge," says former Mott MacDonald divisional director Alan Simpson, who was one of the engineers on site.

The design team was lean by present day standards, with just 15 engineers on site. Mott MacDonald teamed with consultant Freeman Fox & Partners, which provided additional design support based in London. However, progress was swift. Simpson says that this was thanks to the quality people involved, and the fact that the design had been developed with the contractors (a joint venture between Sir William Arol & Co, Cleveland Bridge and Dorman Long) for buildability, which resulted in a number of key innovations. "All the focus was on how it was going to be built and the contract included a pain share, gain share on savings," Simpson says.

Piers for the main towers were founded in rock some 35m below the bed of the Forth. Sheet pile caissons were formed around figure-of-eight shaped frames. Concrete pours at the base of the caissons achieved a seal that enabled dewatering. As excavation for

Each element of the bridge was bolted together high above the estuary.

the foundations advanced through silt, gravel and boulder clay, concrete ballast was added to the caissons, enabling them to slide downwards under self-weight until bedrock was reached. The great advantage of this technique was it avoided the need for use of underwater work using compressed air.

Towers each consisted of two legs joined by diagonal and horizontal bracing. Each leg in turn was composed of three steel boxes connected together by cover plates. A 'climbing rig' was used to lift and mount box elements, enabling the towers to be raised in 12m increments. When Heathrow Terminal 5 was being built, the construction industry looked on with admiration when trial erection of the roof took place. But that was nothing new to Simpson and colleagues: All steelwork in the towers was pre-assembled before leaving the fabricator's yard to check alignment and tolerance, and achieve a first time fit on site.

'Piece-small' construction was used for the entire superstructure. "Individual items lifted into place and bolted together above the Firth of Forth," comments Simpson. The approach was driven by the lifting capacity of contemporary equipment, but also by the need to keep to programme in the unpredictable Scottish weather. Piece-small construction reduced wind-related risk.

"Bolted connections were a key innovation," comments former divisional director Jeff Young. "On Forth we moved away from the US technique of rivets to friction bolting – something introduced by Freeman Fox partner Sir Gilbert Roberts. They had never been used before but they were ever after." Bolts were simply faster and easier to install.

"Another innovation was to separate the dual carriageway road decks to increase aerodynamic stability necessary for the the high wind environment high above the Firth of Forth," says former technical director Don Farquhar. An alternative approach to achieving aerodynamic stability using an aerofoil was adopted when we designed Severn Bridge. Later as the Hong Kong Government's Engineer we combined these two principles developing a vented and streamlined deck for the Tsing Ma Bridge in Hong Kong (opened in 1997) where even greater aerodynamic stability is required to cater for typhoon winds. The separation of the decks on Tsing Ma was optimized to achieve the highly onerous aerodynamic stability for the railway operation on the bridge."

"On bridge design you are always on a learning curve," says current bridges director Jeff Fisher. "We design, construct and maintain these bridges, then based on experience improve them. We have the ability with computers now to look at design options in great detail but you could not do that in the late 1950s with labourious hand calculations. A lot more depended on experience and if there was a deficiency, you built up your knowledge for the next time." Today experience remains essential at the concept stage to aid the convergence towards the optimum design.

In terms of the Forth Road Bridge, protection was in place against corrosion but the structure had other ideas. "The cables were heavily compacted, then covered with red-lead paste and a 4mm wire wrap which we painted. But the cables, composed of thousands of individual wires, breathed, expanding and contracting allowing the moist marine air to get in to the cable and initiate corrosion ." Dehumidification systems installed recently when the problem was discovered after the bridge had been in operation for four decades are containing the issue now, another example of engineering responding to need and emphasizing the value of pro-active mainbtenance management.

Forth Road Bridge put Mott MacDonald in the vanguard of bridge design where it still is today. After Forth the company (again with Freeman Fox) moved on to the Severn suspension bridge and as the decades went by its skill with the design led to it being appointed the designer of worldclass masterpieces like Tsing Ma Bridge in Hong Kong and providing advisory services to lenders financing major infrastructure projects such as the 3rd Bosphorus Bridge in Turkey.

Mott experience: Jeff Fisher and Jeff Young (standing); Alan Simpson and Don Farquhar (seated).

Welsh cable stay first

The UK's first modern cable stay, George Street Bridge, Newport, was built in 21 months at a cost of £980,000 to a Mott Hay & Anderson design with Cleveland Bridge as the contractor. The cable stay concept was evolved for speed in the post war reconstruction of the Rhine crossings and it was chosen for Newport as a quick, cost effective way of giving the town a new bridge over the Usk to relieve traffic congestion. "Mott lead designer Charles Brown would have liked the fact this was the first of a new style of bridge," says Farquhar. "He wanted to be at the cutting edge and knew that to understand something you have to build it. It was very far sighted to understand how cable stays would take off. Usk had a 500ft main span but 1000m are now economic with and the Chinese and Russians having built spans of around1100m – on Sutong (1088m) and Russky (1104m)."

Queen Street bridge in Newport Wales. Image by www.zephnixon.co.uk

Time to pick and choose

Supporting the growing infrastructure market is presenting both challenges and opportunities for small to medium sized firms who are being more selective over clients, *Bernadette Ballantyne* discovered at our round table event with software firm Deltek.

When enterprise resource planning (ERP) software firm Deltek released the findings from its 2014 report 'Trends and Challenges in Architecture and Engineering' the findings highlighted that the industry had growth at the forefront of its collective mind. Of the 235 firms surveyed 72 percent were expecting growth in the year ahead compared to 66 percent in 2013. But the survey also highlighted the challenges facing the industry, which was hit hard by the prolonged recession where prices were driven down so low that firms were forced to walk along a knife edge – balancing fighting hard to win much needed work against achieving the tightest of margins.

Today things are looking brighter but the challenge for consultants is to achieve their growth ambitions in a sustainable way. To further explore the issues laid out by Deltek, Infrastructure Intelligence gathered 12 of the industry's leading consultants, focusing on small to medium companies, for a round table discussion to dig deeper and discover what lay behind some of the findings.

Delivering profits

Enabling controlled growth that provides great career development opportunities for engineers and professionals but also delivers profitability was considered a high priority. "We only want to work for clients that value the value that we bring," said Steve Wooler, managing director of BWB Consulting. "It sounds simple but many of the clients we have worked for just want to extract the maximum service for the smallest fee or sometimes not even pay at all. Eventually we will just get rid of those high maintenance clients and invest in building long term relationships with more sophisticated organisations."

Clients that have been in the habit of 'extracting the maximum service' without respecting payment terms are set to find it harder to secure good quality consultancy services in the growing market. "Some of the major contractors of this world are absolutely the worst payers that we have worked with," pointed out David Dryden, chairman of the multi-disciplinary consultant Cundall, highlighting one UK based tier 1 contractor in particular. "We are avoiding being on projects not only by declining to work for them but also by asking not to have them on tender lists if necessary. We won't work with them at all. Seriously why should we? They should now feel the effects of their behaviour in the past."

Another effect of the growing market should be rising fees said firms who are already reporting that some clients are seeking to secure long term resource on relatively high margins. "There is a massive amount of work out there and we are underselling our services," said Michael Coombs, senior partner at Alan Baxter & Associates. "During the recession fees were too low, so to maintain quality we all did more than we were paid to do. What I find extraordinary is how long it takes the pendulum to swing for people to realize that we should be charging more."

Clients will notice however when firms start to turn down work said participants. "We have just done a labour plan to 2033," said Paul Jackson, sector director for infrastructure at NG Bailey, which is a tier 2 contractor specialising in mechanical and electrical engineering services. "Considering the growing work in rail and new nuclear we have found that we will have to be more selective."

Participants:

- Chair: Antony Oliver, Editor, Infrastructure Intelligence
- Michael Coombs, Senior Partner, Alan Baxter & Associates LLP
- Steve Wooler, Managing Director, BWB Consulting
- David Innes, Senior Partner, Campbell Reith Hill LLP
- David Dryden, Managing Partner, Cundall
- Fergus Gilmore, Managing Director, Deltek
- Chris Duddridge, Senior Business Director, Deltek
- Mark Cowlard, Partner and Group Head of Rail, EC Harris (UK) Ltd
- Mark Ingram, Managing Director, GHA Livigunn
- Neil Smith , Senior Partner, Max Fordham LLP
- Paul Jackson, Sector Director Infrastructure, N G Bailey
- Steve Capel-Davies, Partner, Peter Brett Associates LLP
- Andrew Almond, Partner, Pick Everard
- Tushar Prahbu, Director, Pell Frischmann
- Bernard Obika, CEO, Roughton Group Limited

Resourcing challenge

"Without questions resources are the biggest constraint for the whole global industry," said Mark Cowlard, a partner and group head of rail at the largest consultant at the discussion EC Harris. "We have to grow in order to create more opportunities for our people to step up into those roles and for retaining them in order to maintain the business goals that we have in the first place," he said.

This is even more challenging for an industry coming out of a recession as firms are struggling to retain staff that have weathered the storm of salary cuts, redundancies and working for cut throat fees. "People hunkered down during the recession and we expected staff churn as soon as the job market improved but I think we have been somewhat taken aback by the extent of it," said BWB's Wooler.

With ambition returning to the market some staff are looking for new opportunities (and more money) making this a busy environment for recruitment agencies. Frustration among firms over the role of agencies was palpable with the industry trapped in a cycle of paying higher rates to agency staff to fill gaps while at the same time losing their existing engineers to agencies who are offering significantly higher salaries.

Furthermore this is a short term cycle as firms report that agencies seek to fill roles rather than build careers. "Since things have picked up we have been rich pickings for the agencies and we have found that very hard," said Coombs who recently had to object to a recruitment advert circulating in a structural engineering magazine that specifically requested engineers trained by his firm.

Top: David Innes, Campbell Reith; Mark Cowlard, EC Harris; Tushar Prahbu, Pell Frischmann.
Bottom: Antony Oliver, Infrastructure Intelligence; Steve Capel-Davies, Peter Brett Associates LLP; Andrew Almond, Pick Everard.

"We invest a lot in training and an Alan Baxter engineer is quite sought after."

Retention of staff is therefore high up on the agenda for all companies. "You probably have to recruit at double the rate that you think that you would to cover the bleed of people going away," said Mark Ingram, managing director of consultant GHA Livigunn. "You absolutely have to pay market rate otherwise you are at great risk of losing people and will end up paying agency fees, and losing time in management and disruption."

Other firms report the problem of staff being poached by client bodies who are paying up to £20,000 per year more – a figure which firms say they can't compete with even if they over promote their engineers.

One of the key strategies employed by international consultant Roughton Group is to ensure that staff can move around. "We have low churn because we can offer variety. When people get fed up we can offer them something new such as a project in Botswana. Of our younger graduates we have only lost two in four years," said Bernard Obika, the company CEO.

Bringing in graduates is another challenge for firms who said that one of the benefits of the recession was that better quality graduates were more available, and less likely to go into banking. "We saw fantastic graduates coming through during the recession. We have actually had people come from banks to work for us as engineers," said Coombs.

At the same time Capel-Davies pointed to the new University Technical Colleges for 14-18 year olds as being a fantastic training ground for young engineers. "We at Peter Brett are supporting the UTC in Reading and it is phenomenal."

However the group called on the government to do more to encourage more young people to study engineering. "The government could influence the situation through tuition fees. They did it with teaching for science and maths teachers with bursaries. Drop fees for engineering," said Ingram.

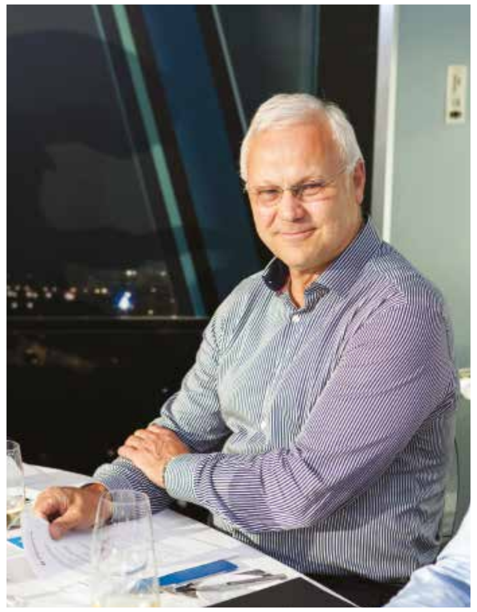
Billing challenge

Perhaps one of the most startling findings of the Deltek report was the revelation that among the surveyed firms 26 per cent reported that only 74 percent of billable hours are invoiced with over one quarter being lost. "The number one problem a couple of years ago is that there was not enough work so in a way this is a nice problem to have, but unfortunately the fees are not all being recovered," said Fergus Gilmore, managing director of Deltek. He pointed out that the survey finds showed that the issue was applicable to both time and material and fixed price projects. "My personal view is that one of the reasons for it is down to the contraction of staff and then new projects come in and the area of project management is suddenly under resourced and very quickly out of control."

Firms agreed that scope creep was a major contributor to this problem with designers by nature seeking to develop unique and innovative solutions. "My engineers are very passionate about innovation and doing the best possible job that they can and that burns fee," said Neil Smith. "One of the problems that we have is that we will go on and on designing until it is perfect even when there are changes to the brief, and we are not very good at charging for it."

A side effect of this pointed out Jackson of NG Bailey is that this can also lead to over complex designs which then have to be simplified. "This is a really important point because it can be over engineered and sometimes the only way that we can win a bid is to take it back to something more simple."

For some this means tighter internal controls might be needed. "I can look at my people and from experience I know who needs closer management in respect of fee expenditure," said Andrew Almond, partner at Pick Everard, who pointed out that a positive thing to come out of the recession is that it forced the firm to manage internal risks better and

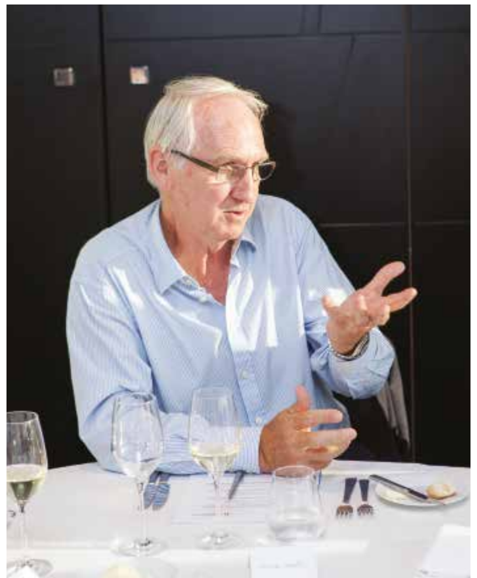


David Dryden, Cundall.

Mark Ingram, GHA Livigunn.

Paul Jackson, N G Bailey.

Steve Wooler, BWB Consulting.



Michael Coombs, Alan Baxter.

Bernard Obika, Roughton Group.

appoint a person to manage this on each contract. "We found that we were, and remain, really good at looking after our clients and making sure that the client is protected from risk but we were not so good at protecting ourselves in terms of negotiating fees for additional work."

A barrier for firms which emerged was the reluctance of engineers to ask for money and this is something that some companies were focusing on. "We should be proud of asking for proper remuneration. It is a cultural thing that we are trying to ingrain in our future leaders, to be forthright," said Wooler.

In the main firms agreed that it was important to ensure that client facing staff were aware of the implications of changes and over servicing. "It is incumbent on all of us to be corporately tenacious in terms of how we manage our customers and approach our clients, you have to set the stall right from the beginning with your customers. Let them know that if they ask for something different then there is a likelihood that they will have to pay for that," said Cowlard.

Technical investment

The need to invest in new technology came out as a priority for firms with only 7 percent of survey respondents not planning to invest in their systems and tools. This was 14 percent in 2013. Furthermore 63 percent of firms are expecting projects to make more use of technology in the future. "Architecture and engineering are very entrepreneurial in how they build their infrastructure and they are very willing to try new ways of working," said Chris Duddridge, senior business development director at Deltek. "From tools to look at new technologies, to those that integrate the solutions that they have already have, compared to other professional services architecture and engineering firms are way up on the investment spectrum."

Participants in the discussion said that investment in communications tools and BIM software were priorities, especially if firms wanted to be competitive after the recession. "We saved hundreds of thousands in travel costs through investment in communications," says Obika who has also invested in internal software where the benefits are harder to quantify but no less significant. "We use it as a selling tool. Walking in front of a client with this unique technology provides a value that we cannot quantify but it gives the client the impression that we are at the forefront of technology."

The tools themselves are also evolving to better facilitate client communication

Payment:
"We are avoiding being on projects not only by declining to work for them but also by asking not to have them on tender lists."

Payment:
"What I find extraordinary is how long it takes the pendulum to swing for people to realize that we should be charging more."

Resources:
"We expected staff churn as soon as the job market improved but I think we have been somewhat taken aback by the extent of it."

Technical investment:
"Architecture and engineering are very entrepreneurial in how they build their infrastructure and they are very willing to try new ways of working,"

Growth:
"What we are really trying to focus on is controlling growth and focusing on profit not turnover."

in the future.

"There are a number of technology solutions where social feeds and streams are being introduce that supplements the client contact," says Duddridge. "We have a collaboration tool that we have tightly integrated into many of our products and that is starting to help clients engage in parts that are not face to face."

Controlled growth

Looking ahead at the growing market firms were cautious over what level of growth was sustainable and appropriate. "For me growth is an outcome not a target," said Tushar Prahbu, director at consulting engineer Pell Frischmann. "The point of what we do is to service clients and if we get that right and they like us a lot we will need more people. The people and relationships drive growth and the money comes afterwards."

"We are looking at 5 – 10 per cent but what we are really trying to focus on is controlling growth and focusing on profit not turnover," said David Innes, senior partner at Campbell Reith Hill LLP. Other firms said the same with "controlled growth" being the overwhelming ambition and boosting profits being key for most organisations. Raising the capital to support growth was raised as a concern by some firms, along with retaining and resourcing the market.

Despite the challenges firms were largely optimistic about the future with busy markets enabling consultants to exercise more selectivity over who they aim to work with and technology bringing in more efficiency. For small to medium businesses with a strong sense of identity and a focus on quality the next few years are awash with opportunity.

'The roundtable was held in association with Deltek. To see the Deltek report go to: **www.deltek.co.uk/AEReport**

Mediation – the pragmatic route to low cost dispute resolution?

A recent mock mediation event by Griffiths & Armour and Hill Dickinson demonstrated that good sense can prevail even in the toughest disputes. *Antony Oliver* reports.

The standard advice from anyone that has been involved in a construction industry contract dispute is straightforward – if at all possible stay out of court.

If the ruling goes against you it could be hugely expensive or at best have a substantial impact on your professional indemnity insurance premium or ability to even obtain cover.

One way to stay out of court is by using mediation. It is a process which will generally be encouraged by the courts, and especially the Technology and Construction Court. Whilst it is entirely voluntary the courts can take a negative view of parties who bypass the possibility of mediation.

And yet, for all its benefits, mediation is still viewed with suspicion in some circles, possibly due to a perception that a "successful" mediation in fact leaves all parties feeling slightly disappointed. It is still not as widely used as it could be, especially in jurisdictions where it is not actively promoted by the courts as a cost effective alternative to trial.

To try to overcome this reluctance and to demonstrate that, even when parties appear to be impossibly far apart it can be possible to mediate a solution, insurance brokers Griffiths & Armour joined with lawyers Hill Dickinson to stage a mock mediation event.

The scenario – played out with amateur dramatics gusto by members of the two firms' expert teams – would have been alarmingly familiar to many.

A two storey basement development in the £10M Kensington home of a private owner goes wrong leaving her with a damp and unusable space.

She is claiming £1.6M for structural repairs, cost of making good and other losses including distress, anxiety and disruption to her holiday. She is looking to the architect, structural engineer and contractor to foot the bill plus costs.

The builder was clearly out of his depth, but maintains he simply did what the engineer told him.

The structural engineer was guilty of not specifying or supervising critical work. However, his contract included a £100,000 cap on liability.

Meanwhile the architect was guilty of permitting the substandard work to progress but he failed to notify his insurer of a possible claim and thus had no professional indemnity insurance to support him and was poorly advised by his lawyer as a result.

So on the face of it, this would seem an unlikely candidate for being concluded at mediation.

Clearly the owner was due some damages but how much is fair? And with the parties all so far apart in terms of blame and with no obvious financially liquid target ready or even able to pay, how could it ever settle?

Despite these hurdles the parties reached a deal. As the case played out it transpired that the architect, while perhaps not the most guilty party, did have both cash to pay and a client relationship to maintain.

Similarly, the builder was also happier to settle rather than risk further revelations of his cost cutting being flushed out in court.

And the structural engineer, while sitting on an enforceable liability cap of £100,000, was prepared, on advice from his insurance broker, to settle at a higher sum given the risks of seeing the dispute continue to trial.

The client, keen to avoid a public airing of dirty linen in court, agreed to settle for £950,000 plus costs.

So while fictitious, the mock process demonstrated that, provided all parties work towards a pragmatic solution, good sense can prevail.

It also highlighted that while it is often thought that being insured attracts liability, if you are uninsured but have assets you can come off worse.

Five points for successful mediation:

1. **The process is consensual** – it requires parties to cooperate towards a common goal of resolving the dispute.
2. **The mediator's role is pivotal** – they have to strike a balance between driving a deal and allowing the parties to take the initiative.
3. **Individual personalities can help or hinder** – professional legal representation can provide a buffer or it can replace one problem with another.
4. **Preparation is vitally important** – disclosing key new information on the day is not helpful and unlikely to promote a deal. Lawyers need to have been fully briefed by their client in advance.
5. **Written terms of engagement can be enormously valuable in negotiations** – such as liability caps, net contribution provisions and scope of services.

Infrastructure Intelligence will be working with Griffiths & Armour over the coming months to help explain some of the key insurance issues facing construction professionals. For further information visit www.griffithsandarmour.com

A packed audience of professionals picked up valuable advice during the mock mediation.

The world in 2020 – five mega technology trends that will transform your consultancy

Our world is facing unprecedented technological, societal and economic change. So how can you prepare to prosper? Five emerging trends will re-shape how you do business in future *explains BST Global's executive vice president Javier Baldor.*

"A good hockey player plays where the puck is. A great hockey player plays where the puck is going to be." So said ice hockey legend Wayne Gretzky.

The question is, Where will the puck be in the coming years?

To help you get ahead of the proverbial puck, I have identified five technology trends to watch, based on findings from leading IT research firms like Gartner, technology companies like Google, and private equity firms like Kleiner Perkins Caufield & Byers (KPCB).

Trend 1 – The Cloud: A Whole New World

There is a significant transformation and fundamental shift emerging in computing architecture. It is called Cloud Computing – the use of computing resources that are delivered as a service over the Internet.

According to Forrester's forecast data reported in "Sizing the Cloud," the global cloud computing market will see a 592% increase, growing from a USD 40.7bn to a USD 241bn market in 2020.

Factors driving this growth, according to private equity firm KPCB, include:

- Rapidly falling processing costs, while the cloud and accessibility rise.
- Computing costs declining 33% annually (1990-2013).
- Storage costs declining 38% annually (1992-2013).
- Bandwidth costs are declining 27% annually (1999-2013).
- Smartphone costs declining annually at a 5% clip (2008-2013).

Trend 2 – Web 3.0: Where the Cloud Meets Internet Pervasiveness

The Cloud will be the foundation of the Internet of the future. To understand the Internet of the future and Web 3.0, we must first look at what came before.

Web 1.0 (1990-2000) allowed firms to put brochures on websites and removed geographical restrictions associated with a brick-and-mortar business.

Web 2.0 (2000-2010) was based on user communities and services, such as social networks, blogs, and wikis that encouraged collaboration and information exchange. Think Facebook, YouTube, or LinkedIn, where people can post and others can comment.

Moving forward, Web 3.0 (2010- 2020) will see everything connected, anywhere and all the time, over the Cloud. Not just computers, but also refrigerators, clothing, and cars will carry IP addresses.

This is also known as the "Semantic Web." And according to Murray State University, researchers are trying to teach computers to know what we mean when we search, not just which keywords we type.

Trend 3 – Going Mobile: Anywhere, Anytime

The consumerisation of technology has taken shape and is dictating what the business technology landscape will be.

According to KPCB, operating systems have been re-imagined and transformed beyond prediction. From 1998 to 2005, Microsoft dominated with 96% market share. By 2012, Microsoft's operating system share was down to 35% with Apple iOS and Android commanding 60% share.

There were 2.4bn Internet users in 2012. The fastest growing segment is in emerging markets like China, which added 500M mobile users from 2007-2013. This represents 80% of China's Internet users and more mobile critical mass than any place in the entire world.

Global mobile traffic exploded and is expected to be about 38% of total Internet traffic at the end of this year, up from 25% in May of 2014. Smartphone subscriptions are at a staggering 1.5bn, witnessing a year over year growth of 31% in China, 28% in the USA, and 52% in India.

Research from Gartner shows that by 2016 Android will be the number one smartphone operating system at just over 50%, Microsoft will be second at 23%, and Apple third at 21%.

Meanwhile, Apple has sold about 140M tablets in the 3 years since the iPad was introduced – over three times more than the iPhone over the same period. Gartner forecasts that 170M iPads and 137M Android based tablets will be sold in 2016.

It is estimated that 1 in 8 people will have a tablet in their hands by 2017.

Trend 4 – The Wearables and Everywhere Computing

The next transition from mobile Internet computing will be wearables or everywhere computing, which began in 2014 with Google Glass and similar devices. The average person reaches for their smartphone 150 times a day – unnecessary with so-called Sensor Enabled Wearable Attributes.

The benefits are clear:

- Hands free, voice and gesture control,
- Always connected to the internet, and
- Environment aware with built in GPS.

Trend 5 – Surface Computing: The Vision of the Future

Imagine a world where everything is a computing surface: your coffee table, mirror, desk, refrigerator, or windows. It is coming by 2020. It is not easy to envision, but Microsoft has developed a video at www.microsoft.com/office/vision/ to demonstrate the power of this trend.

There are many opinions on where the puck is going to be in the future. But what is certain is that the world will witness unprecedented changes and opportunities in the years ahead leading up to 2020 and beyond. The key question is, Will you be ready?

Rail 2050 – everything is possible

Arup has looked into the future and seen a vision of hydrogen locos, swarm robotics and seamless journeys. *Jackie Whitelaw* reports.

A new report from Arup, the Future of Rail 2050, has set out to challenge everyday thinking and get people to focus on the forces shaping rail's future, according to its lead author Colin Stewart who is the consultant's global rail leader.

2050 is just over 35 years away, a heartbeat in terms of the current pace of change in the rail sector. "But if you look back 35 years who would have thought of 3G and 4G then or the impact that technology is having now," says Stewart. "We are trying to challenge the perceptions of what could be. Most of the technology we mention is in the embryo stage or in use; it is just a question of bringing it into the rail industry.

Rail has been slow to change in the past but there is a new mood now in favour of innovation."

Driverless trains

These, Stewart suggests, are high up the list. "We are already working on cab based signalling for the East Coast Main Line, that's a stepping stone to driverless trains somewhere. And you can already see it in action in place like Brazil, in Sao Paolo, where driverless trains are carrying 700,000 people a day."

The report highlights mining company Rio Tinto's plans to use driverless trains in Western Australia to deliver iron ore to ports in what will be the world's first automated, long-distance, heavy-haul rail network. The roll out begins this year.

From top:
New Delhi Railway development;
Dubai Metro;
Colin Stewart – "Most of the technology is in the embryo stage or in use."

New power sources

By 2050, the Arup team think that hydrogen or hydrail could be the primary means of powering trains. The hydrogen would come through nuclear, wind, solar, solar concentrate, hydroelectric or other emerging ways of making hydrogen, with the fuel source being particularly useful for remote rural lines which are unlikely to have been electrified.

Engineering staff and students at University of Birmingham designed and built a prototype hydrogen powered locomotive in 2012, the first of its kind to operate in the UK, the report highlights. In 2013 China rolled out its first hydrail locomotive through a project at a Chengdu university.

3D printing

This, the report says, is expected to revolutionise the supply chain, reducing the need for mass produced manufacturing, transportation and storage, with certain industry sectors shifting from central to decentralised production and from intercontinental shipping to more regional and domestic distribution.

"3D printing has the potential to change the whole world – you can buy a blueprint rather than the actual item, but you still need the raw material. That still needs to be distributed to people's doors." Rail is an obvious route and the report highlights the future significance of rail freight. But Stewart suggests there is more deep thinking to be done. "We have done studies in Amsterdam for example, on using the tram network to distribute goods to shops."

Seamless travel

The holy grail of seamless, integrated, multi modal journeys is also seen as a must have by 2050. "Technology will help the transport sector come together," Stewart says. "Speed and access to data will influence passengers' relationship to transportation, as well as their decision-making processes. Passengers will expect certainty in terms of time, so reliable and accurate real time information will be key and they will assume optimal pricing," the report suggests.

"Big data and the Internet of Things will allow transportation modes to communicate with each other and the wider environment, paving the way for truly integrated and inter-modal transport solutions."

The growth of use of technology in transport will have an added benefit, Stewart says, in attracting new, young minds that are excited by IT and technology to the engineering sector.

"We produced this report because it makes us think, as a consultant," he says. "But we also push it out to academia and schools to enthuse the next generation, attract the best brains to infrastructure and rail. People don't think civil engineering is connected to technology but this report demonstrates strongly how much it is."

Rise of the drone

Intelligent robots will play a greater role in the inspection of infrastructure such as tunnels and bridges, the Arup report says.

"Smart robots are already being built to repair and retrofit water pipes, while crawling robots can test load-bearing cables and tethers of bridges, elevators and cable cars. Swarm robotics, a theory based on swarm behaviour seen in ant and bee colonies, is another area for the future. It involves small individual robots working towards a larger goal by distributing the work. Mining, weather sensing, infrastructure repair and large scale construction could one day benefit from swarms of cheap robots."

Monitoring drones

Dutch railway company ProRail uses drones equipped with infrared sensors to check the switch point heating systems on its tracks. Using the drone's images, the company can see whether the switch point heating systems are operating correctly.

In Germany, Deutsche Bahn is trialling micro drones to help combat graffiti on its property that cost the company over £6M to remove in 2012. The drones are equipped with high resolution infrared cameras and hover 150m above the depots watching for trespassers. Next step is to use drones to inspect railway track.

Changing track on the Tube

As the Tube blockade underway at Uxbridge nears completion *David Waboso* explains London Underground's approach to track renewals and *Jackie Whitelaw* talks to infrastructure programme director George McInulty about the new ideas that are speeding up one of the toughest tasks on the capital's metro railway.

The 22km challenge

Keeping four million people moving every day while we carry out a massive programme to upgrade train, stations, signalling and track is without a doubt, the biggest challenge of my job. While we do everything we can to keep disruption to customers at a minimum, in some cases it's unavoidable, says London Underground's director of capital programmes *David Waboso*.

Track renewals – 400m every weekend

Like other railways, we need to renew and upgrade our track on a regular basis. The Tube network has 1,129 km of track of which 864 km is used by passenger trains (with a further 266km in depots and sidings).

If you consider that new track has a nominal life of 40 years (depending how heavily used and how well maintained it is), then on average we would have to replace 2.5 per cent of our track every year to stand still, which equates to nearly 22km per annum of the passenger network or just over 400m every weekend. As with many of our assets, a historical under-investment has left us with a backlog, so the actual amount we need to replace is even higher.

Upgrading track on a 150 year old network used by millions of people each day is a huge challenge. Track renewal on the ballasted, open sections of our railway firstly requires all the signalling and power equipment that is mounted on or adjacent to the track to be removed, then excavation of the old track bed and putting in of new ballast (coarse gravel) foundation.

"If you consider that new track has a nominal life of 40 years (depending how heavily used and how well maintained it is), then on average we would have to replace 2.5 per cent of our track every year."

This produces thousands of tonnes of waste to take away and thousands of tonnes or up to 15 trainloads of new ballast to be brought in. Once completed, the signalling and power kit must be reinstated and thoroughly tested, before hand-back for start of traffic.

Shrunken plant and hot sections

The Tube historically has "capacity" signalling (in effect lots of short signal sections) and we are also unique in having two power rails mounted on the track, so there are hundreds of items of equipment to deal with. Additionally, the deep narrow tube sections, especially where there are points and crossings, are even more challenging as we need "shrunken" bespoke plant and the hot small sections are difficult work environments.

Creating time

Clearly, it is impossible to do all this work while running a train service so we must carry it out in closures at nights and weekends or where appropriate, in block closures at weekends. We use these at times when traffic is lower such as school holidays and where there are viable alternative routes either on the Tube or other modes of transport, and this allows us to carry out far larger amounts of work more efficiently than during weekends.

The large amount of heavy plant and equipment required to mobilise a site takes significant time to assemble within the worksite, demobilising a site takes time as well. The combination of these soaks up many hours of weekend work time so a block closure eliminates the continual weekend mobilise/demobilise and therefore allows for much more work time and saves days of unproductive time. The latest, at Ruislip-Uxbridge goes on until 10 August and will allow us to carry out 6km of ballasted track renewal and drainage work between Ruislip and Uxbridge and replacing a number of points and crossings at a complex junction at Harrow-on-the-Hill. This will again save significant time and money compared to the use of weekends. The beauty of this approach is that during a block closure we can blitz all major assets in the area and therefore don't have to go back for many years.

Weekend overnighters

But there are areas of the network that are not suited to this approach, or even to weekend closures, because they are busy all the time. We are therefore looking at different approaches to these central areas and are pioneering the use of innovation to deliver track renewals overnight so that by the use of multiple worksites within a section, together with new plant and intensive labour, we hope to soon be able to renew track just using the three to four hours available at nights. We are working with our track partner Balfour Beatty on this with whom we've also brought in new track materials and techniques, the first on the underground for decades. (See accompanying story.)

Closures mean a huge amount of work can be completed quickly as here at Earl's Court (top) and Hainault (centre). Neasden junction work required the replacement of 46 points (bottom).

Rethinking the basics

"My favourite fact," says George McInulty, London Underground's infrastructure programme director, responsible for its Track Partnership, "is that in the first three weekends of this year we delivered 50% of the total volume of track we relayed in the whole of 2012."

That impressive achievement has come about through redesigning many of the products that go into the railway track renewals to make them quicker to install, rethinking the work processes and training the workforce to operate like slick Formula One teams.

What has driven the change is the need to reduce the amount of Tube weekend closures to keep an increasingly busy London moving even outside the working week and to get ready for the introduction of 'Night Tube' services expected from 2015.

"We started work on how we can achieve that well ahead of demand. Our aim is to have far fewer weekend closures," McInulty says. "But we still have some thinking to do and we need the whole industry to help us with that (see box)."

Track renewal on a 150-year-old Tube network is not something that can be avoided but it can be made far more efficient, McInulty says. And he has some good results to share. "We have between two and three hours work time a night to replace sleepers, ballast and rails which we do in a staged approach replacing ballast and sleepers on one shift and then delivering the rails the next. When we started the improvement process in October last year we were doing 2-3m a night. Now we can manage up to 20m."

The obvious question is how?

Access

"On access, we have worked across the organisation to reduce every single minute of non usable time and turn it into usable time in terms of safe site set up and starting work – it's a matter of mindset. We are now 22% quicker at getting boots on the ground. Everyone from the signallers to control room to the operations team all understand what we are trying to achieve. We have not cancelled any trains to gain the extra time but we have re-routed engineering trains to get better access.

Methodology

"We have set up a training facility where we have drilled each individual in the processes and got them quicker and quicker, like Formula One tyre changes. We are up to 20m from 2m now and we picked up some new ideas on a recent visit to Tokyo, particularly on ballast, that will move us beyond 20m.

Engineering

"We have looked at every tool we are using and tried to refine each of them to get them lighter or create a quicker method. For instance we have moved from using Kango jacks for compacting the ballast to lighter vibrating vertical tampers that get the ballast in position much faster. We have introduced smaller, more agile, mini diggers to the traditional civils plant. And in future, working with Balfour Beatty, we are going to procure special 5t mini diggers specifically designed for LU overnight track renewals.

Products

The sleeper fastening system, the pot the conductor rail sits on and rail welding have all been rethought, as has track drainage.

Sleeper fastening: "We have redesigned the sleeper fastening system for speed. There used to be three parts that required labour to install and configure on site. That's been replaced with a fast clip system developed with Pandrol that's safer and quicker to place," McInulty says.

- Conductor rail: "The conductor rail arrangements used to have 15 components that were not easy to adjust; now we are down to four that can be pre-assembled and adjusted simply on site. That was something we adopted from Balfour Beatty's work on the mainline railway."
- Welding: "We have switched from traditional Alumic thermic welding which took 40 minutes, to flash butt welding which takes seven minutes. That's something picked up by attending industry networking events like Future Rail," McInulty explains.
- Drainage: "Our work on track drainage had previously been constrained by the availability of engineering trains to bring the drainage product to site. It was often a separate activity to track renewal. So we replaced the need for trains. We looked at what was going on in Europe and collaborated with Mercedes Benz to introduce a rail-wheeled tractor 'Unimog', converted to suit LU rail so now we can deliver drainage without reducing the amount of new track we are installing."

R&D

"We are working on ways to deliver ever quicker track renewals and are confident that we will be leading with innovations that we can share with the world," McInulty says. "For instance, we are bringing in mechanized rail movement, using track rail transporters that are like little robots that move rail into place – much safer, and twice as fast as using traditional labour. And we have introduced robotic saws to mill the rails which again is faster, and safer."

Looking ahead LU has plans to create a new track formation that doesn't need to be replaced every 40 years, more like 80. "We are looking at basic engineering principles to develop a better product to leave a better legacy for the people managing and maintaining the Tube in the years to come."

The future – LU needs industry help

The Tube track renewals teams are facing some big tasks next year involving the replacement of junctions in the deep Tube at Walthamstow, Tottenham Court Road, Camden Town and Liverpool Street.

"This will require unique solutions for major challenges such as the break out of concrete, lifting in confined spaces, extraction of heavy material through confined underground locations and environmental management – particularly the dust and heat that results from working with concrete," McInulty explains.

"We need the industry to help us come up with the best ideas as we can as to how to do the work most efficiently and safely. Anyone wanting to get involved should visit the TfL Technology Innovation Portal."

The Uxbridge blockade

The Uxbridge blockade is underway from 19 July to 10 August and involves replacing almost 6km of life-expired track, drainage and points. Piccadilly Line trains are not running between Rayners Lane and Uxbridge and Metropolitan Line trains are stopping at Ruislip. London Underground's Stuart Burnett, who is head of strategy and planning for the Track Partnerships says the blockad is the best long term option for travellers. "We can complete the work over a three week period rather than using 14 separate weekend closures."

LU's programme director of infrastructure George McInulty says the project is a culmination of major improvements across the SSR network.

"In addition to supporting line reliability improvement plans, the work will also help realise the full benefits of the sub-surface train and signalling upgrade. To deliver more frequent and faster services in the future, we need to upgrade the infrastructure on the Uxbridge branch so it can support the line upgrade."

Blockade in numbers

- 5.9km of new ballasted track between Ruislip and Uxbridge
- 3 bridges waterproofed
- 3.5km of track drainage work completed
- 70m retaining wall at Uxbridge
- 1 points and crossing replacement at Harrow on the Hill

The return of confidence

Matchtech operations director *Grahame Carter* starts a a regular series of articles for Infrastructure Intelligence with a review of why confidence is so high among recruiters and those looking for new jobs.

In April, Network Rail announced a £38bn funding programme for improving the UK's rail infrastructure – the next stage in the most ambitious new rail development programme for a generation.

The details of the plan involve 1360km of rail electrification, developing the Northern Hub and a significant programme of station improvements which come on top of the £50bn proposed HS2 scheme and the work already being undertaken on Crossrail.

This significant investment in the UK's transport infrastructure is good news for the travelling public and for the UK economy, but it is also a vote of confidence in the UK's engineering and rail industries, and a huge boost for jobs and training.

While youth unemployment has fallen, there are still 817,000 people aged 16-24 looking for work, and across the entire economy over two million people are still unemployed. This type of investment in infrastructure provides opportunities for those seeking to work in engineering, and for those already skilled workers looking to progress their careers.

As the economy has improved, following the 2008 financial crisis, the Government has made investing in infrastructure a key foundation for driving growth. And with a growing population, infrastructure engineering will remain a key focus for investment for the private sector.

Matchtech's Infrastructure division that includes engineering recruitment across Utilities, Rail, Property and Highways, Traffic and Planning has seen a 36% in revenues 2014 and we are expecting further significant growth in the coming 12 months based on the ongoing rise in engineering vacancies and jobs, and the number of candidates we are placing into these roles.

The major infrastructure engineering projects being undertaken will rely heavily on both contract (temporary) and permanent engineering staff. We have seen a huge shift in the infrastructure sector with recruitment moving between permanent and contract staff.

The Northern Hub: part of a £38bn investment in rail and a huge boost for the job market and training.

Creating the 'right' balance of project specific temporary workers against permanent staff continues to cause our clients an interesting dilemma. With improved and regulated processes in place for both PAYE and limited company contractors, clients in the engineering sector can be confident that they are engaging with compliant and competent temporary workers, while driving their individual businesses as permanent employment organisations of choice.

Matchtech is now in its third year of conducting an annual confidence index survey with over 1,000 UK engineers to identify current views and perceptions of various industry sectors. Last year more than half (54%) said the state of the UK's economy was negatively impacting the sector, and more than one-in-four of those questioned said they were not confident that they would continue to obtain work in the UK engineering industry. We're about to embark on preparations for the 2015 survey and it will be interesting to see how that confidence has changed, I expect it will have done.

If we are to assist the Infrastructure sector via recruitment, difficult questions also need to be asked including how we improve STEM education and end the skills shortage. Having worked in the infrastructure sector for the past 15 years I can say with confidence that we are currently in the busiest period of growth, development, optimism and investment that the sector has experienced for many years. The future for engineering in infrastructure is extremely positive, major projects and continued investment from both private and public sectors will allow the production of top class engineers but also assist in keeping them in the UK. The infrastructure engineering sector is at the forefront of a major investment in UK growth and jobs, it's a good place to be.

What's next:

Over the coming months Matchtech will be writing for Infrastructure Intelligence to give its view, as leading engineering recruitment specialist, on the news and industry developments and will answer questions such as, "what are clients looking for and does this match with what candidates can and are offering?". You can contact Grahame at grahame.carter@matchtech.com or on LinkedIn.

Letter from: The North West

After many years of disappointing news, ACE members in the North West can finally look to the future with an increasing level of confidence in their workload and their fortunes, writes ACE North West regional chair *Mike Barber*.

A large number of major projects have already been given the go-ahead, including Manchester's Airport City, an expansion of Media City in Salford, the Wirral Waters regeneration project transforming Birkenhead Docks and the overdue investment into the railway network with the Northern Hub and HS2. Whilst the major consultancies will secure the lion's share of these projects, it is inevitable that specialist firms and SME's will be in a strong position to pick up.

More good news followed last week, with the announcement that £1.1bn of Government funding is to be invested in the North West through a series of growth deals beginning in 2015-16. Greater Manchester received the highest award in the country, which is not only an indication of need, but also testament to the skills of our local business leaders and politicians in successfully articulating the regions priorities. The other four Local Enterprise Partnerships in our region also achieved the success in their bids they were looking for.

I have met with many business owners over the past twelve months, representing consultancies large and small from across the entire region. Each one, without exception, is seeing tender opportunities increase, workloads becoming more transparent and many are now actively recruiting.

There is however one negative theme. Margins. Fee levels generally remain in the doldrums, with firms reluctant to prejudice their increasing workloads by raising their rates. It is, however, a vicious circle. Firms need to attract quality staff and this is difficult without meeting rising salary aspirations.

Many firms are increasingly looking to develop their teams by recruiting apprentices and graduates. I am personally delighted to support two national initiatives which have recently been rolled out by ACE in the North West.

One is the launch of Progress Network, ACE's community for young professional consultants and engineers. Its inaugural meeting took place at the end of July in Manchester. Progress Network will bring a high level of networking and connection to the industry, supported by an enthusiastic local management board.

We are also extending our reach to 16-19 years olds by expanding the Technician Apprentice Consortium in the North West. The scheme has also attracted the interest of our partner alliances in CECA and we will see more employers tapping into this fantastic scheme in coming months.

Our regional members will be hearing more about these initiatives over coming months and they will be an essential management tool to support the sustainable growth of our ACE members in the North West.

Summer reception hears talk of cold winds and heating markets

On a warm evening at ACE's very successful summer reception there was much talk about cold weather. But that was the case as a result of using the popular event to launch the latest ACE research into the energy market (see p 16). ACE chairman Chris Cole who is on the board of energy firm Infinis was clear about the issues ahead: "Energy at the moment is the most uncertain and insecure industry I have sat amongs for a long time. Government doesn't know where it is going with it and won't make decisions. There is paralysis and this could become quite serious in a cold winter or two," he said.

However, perhaps inspired by the pleasant environment of the Taj Hotel courtyard near St James's Park in London, he was very upbeat about the infrastructure industry and opportunities for large and small firms alike.

"In infrastructure, there is momentum. We are all enjoying an improvement in workload, infrastructure's voice is being heard and purpose is beginning to emerge with regards to investment.

"I think we are all enjoying the best environment to work in for eight or nine years."

Guests at the reception including Sir John Armitt fresh from revealing draft legislation that could create a National Infrastructure Commission and Highways Agency chief executive Graham Dalton.

Top: ACE chief executive Nelson Ogunshakin with Sir John Armitt. Above: The sun shone on the summer reception.

Everyone was welcomed by ACE chief executive Nelson Ogunshakin who regards events like the summer reception where ACE member firms can all meet and mingle as integral to the activities of the association. The opportunities to network are a key benefit of ACE membership and are organised nationwide by offices in the devolved nations and regions. Nelson encouraged the guests to come back after the summer and watch out for the national SME Conference in September and the European CEO Conference & Awards and annual Parliamentary Reception in November.

Procurement initiative – call for evidence

Over the past few months a number of reports from the UK and Devolved Governments have called on industry to support the reform of public sector construction procurement,writes ACE regional manager *Noel Foley*. ACE intends to make a positive and comprehensive response to this call.

ACE is therefore inviting its members and stakeholders to submit written evidence of difficulties encountered in preparing submissions in bidding for public sector commissions or applying for access to procurement frameworks at local, regional and national level. We also want to hear about examples of good /innovative client procurement practice.

Please go to www.acenet.co.uk/call to provide examples of PQQs, tenders and to provide comment.

ACE relaunches and development seminars

ACE is to launch a number of business-focused courses and seminars that will be presented by our members, affiliates and external service providers, writes ACE chief operating officer *Anil Iyer*. These will cover the topics of legal, contracts, finance, insurance, business development and improvement, HR procedural, personal development, management and leadership subjects.

Many of the courses and seminars will be free to staff from ACE member companies, but some will involve a specially negotiated course fee. And some will be primarily targeted toward certain parts of ACE's membership such as SME's and Progress Network.

The first seminar relates to the changes in procurement regulations and the implications as a consequence of recent EU directives, and will be presented by ACE affiliate BLM as part of the SME Forum event being held on 2 September 2014. This will be followed by a training course on FIDIC contracts on 30 September and 1 October presented by tutors from the specialist training provider European Construction Ventures [ECV].

The decline of Defra

By *Matthew Farrow*, executive director, Environmental Industries Commission.

A couple of years ago I was at a meeting with Caroline Spelman, then Secretary of State of the Environment. She explained that the night before she had baked a cake to bring in as part of celebrations to mark the tenth anniversary of the formation of Defra. To my mind though the now 13 years that Defra has been in existence has seen a slow but steady decline in the power and influence of the department.

Ironically, the birth of Defra which Caroline Spelman's cake was celebrating was the result of previous failure. The new Blair government had created a super department for Environment, Transport and the Regions in a well-intentioned attempt at joined up government (plus the need to give John Prescott a fiefdom befitting his status as Deputy Prime Minister). The experiment wasn't a success, (though it did mark the start of the current political enthusiasm with infrastructure in the form of Prescott's Ten Year Transport Plan).

After the 2001 Election, DETR was broken up with the environment, agriculture and rural affairs part rebadged as Defra. The high point of the Department was 2006-7, when the brief supremacy of climate change as a political issue and David Miliband's drive in his first Secretary of State position gave it real power. Defra officials drafted the Climate Change Act, a world-leading piece of legislation that set binding national carbon budgets and was voted into existence by one of the largest parliamentary majorities for a single Act of recent times.

Ever since though, Defra has been in decline. The causes are many and varied. The first blow was the removal of its climate change responsibilities in 2007 as these were combined with DTI's energy section in the new Department for Energy and Climate Change.

The change from Gordon Brown to David Cameron saw Spelman appointed as environment secretary. She miscalculated in trying to build credit for Defra with the Treasury by offering significant spending cuts and settling early in the post Election spending round. However other ministers dug their heels in and got away with lighter cuts, while Defra's deep staff cuts saw much of the department's expertise disappear.

There followed the forestry debacle. I was told at the time that this was the result of No 10 pushing Defra for an eye-catching initiative to be announced to fit in with Downing Street timescales, and the Department offering the forestry sell off when they had not finished working on the detail and looking at the implications. The result was public outrage and an embarrassing u-turn which sealed Spelman's fate. This was followed by the badger cull controversy and the floods, leaving Defra ministers permanently in reactive mode.

> "Defra has seen a slow but steady decline in the power and influence of the department"

Defra has also seen far more ministerial change since 2010 than most departments. Liz Truss, appointed this week, is the third environment secretary in that time, while Dan Rogerson is the fourth waste minister since 2011. The Ministers I've known in the department have been hard working and committed, but often come and go before they have really grappled with the complex issues the department is responsible for.

The problem now is that these trends gather their own momentum. If a department is seen as lacking influence, political heavy hitters are reluctant to be posted there, and businesses for whom it is their sponsoring department start to look enviously elsewhere (for example many of the waste and recycling firms in EIC membership see a strong case for waste management/resource efficiency to be under BIS control).

Can this decline be reversed? Despite staff cuts many of the officials that remain are excellent. It should be possible to strike a balance between robustly defending environmental interests while working constructively across Whitehall, for example with Treasury on green taxes, with DCLG on planning and brownfield issues, with DfT on air quality, with. And while Liz Truss has not shown previous interest in environmental issues as far as I know and may not retain the job post election, she does offer the chance for a fresh start. EIC will do what we can to support her.

EIC is the leading trade body for environmental firms. www.eic-uk.co.uk