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Creating a low carbon built environment

This is one of a series of papers Willmott Dixon has launched in 2009 on issues facing the construction industry. Willmott Dixon is committed to being a sustainable business that aims to be carbon neutral by 2012 and to make smarter use of natural resources in order to fulfill its commitment to sending zero waste to landfill by 2012.

How construction and the built environment can become low carbon

In the Low Carbon Transition Plan, the government acknowledges the importance of the construction industry to the UK. The headline figures are significant: construction has an annual output in region of £110 billion - 9% of gross domestic product – and employs 3 million people. A healthy and efficient construction industry is required if we are to deliver the sustainable communities of tomorrow.

The accompanying Low Carbon Industrial Strategy identifies low carbon buildings and construction as one of 11 priority sectors presenting the greatest economic opportunity for the UK, based on comparative advantage, technological strengths and natural resources.

The subsequent review initiated by Lord Mandelson, Secretary of State for Business, Innovation and Skills, in September outlined plans to ensure the industry was "fit for purpose" for delivering a low carbon future and being a world leader. It contained the key objective:

"To identify barriers to improved performance by the construction industry, and to consider how the UK construction industry can take forward the low carbon agenda and make recommendations to make the UK a world leader in low carbon construction and the built environment."

These are fine proposals and aspirations, but there is much that can be done to deliver on them and ensure the industry is ready for a low carbon future, both in how it does business, and the built environment it creates and maintains. This paper recommends some key measures that should be taken.

Government leadership so far

While Government recognises construction's role in delivering a low carbon future through its buildings and infrastructure, it has not always provided the focused leadership it needs: there have been nine different construction ministers since 2001, when the Rt Hon Nick

Raynsford MP left the post after a four-year tenure. Five construction ministers have been appointed over the past two years, with Ian Lucas MP the most recent.

The Government announcement on 24 November that Paul Morrell is its new chief construction adviser is a very welcomed as it will give good leadership. It is hoped that Mr Morrell can use his influence across departments to drive a joined-up procurement policy to achieve low carbon change. The Government must also use this opportunity to address sustainable performance of buildings.

While it made some positive points, September's progress report of the **Strategy for Sustainable Construction** noted that the Government is failing to make the required reduction in carbon emissions in its own estate. It drew attention to the Sustainable Development in Government (SDiG) report 2008, which highlighted that the carbon reduction level achieved in the Government estate to date was 6.3%, against a target of 12.5% by 2010/11. It also identified Government's poor performance in using its buying power to set an example by procuring sustainable new buildings or refurbishments of existing property, especially non-housing.

Government and public bodies must demonstrate firm leadership in reducing carbon emissions as the public sector is responsible for 40% of construction output.

Recommendations 1 and 2

Government can use its buying power to lead by example and should commit to three exemplar low carbon new build and three low carbon refits of non-housing developments each year, spread across Regional Development Agencies. These exemplars would be used to measure performance and develop knowledge for wider industry use. This could be led by either DBIS or DECC.
Companies who show real initiative by investing in their own skill set to build, refit and maintain low carbon buildings should be included in a 'low carbon' framework that can bid for such work.

In some areas, central government **is** driving innovation and change through legislation and building regulations, including all new **homes** being built to a zero carbon level by 2016. But it has only **proposed** targets for non-domestic buildings, with the 'ambition' that schools be zero carbon by 2016, followed by public buildings by 2018. To achieve Climate Change Act targets, legislation must be introduced across the built environment with targets to reduce carbon emissions, which would drive **real** innovation and change through the construction industry and in the supply chain.

Recommendation 3

Government must set legislation for non-domestic buildings to achieve carbon targets by 2020 (rather than ambitions), with penalties for non-compliance. It must support this with a robust definition for both low and zero carbon buildings where there is absolutely no ambiguity of what is included and what is not. The same definition must also apply for energy from renewable sources.

Low carbon skills

The UK Low Carbon Industrial Strategy estimates the current global market for low carbon and environmental goods and services to be worth £3 trillion. UK revenues are estimated to

be £106 billion. The goal is to grow the UK domestic and export market, with jobs potentially reaching more than a million by 2015.

At a sector level, skills delivery is in the hands of ConstructionSkills, the industry Sector Skills Council, and the regional centres of excellence. This training strategy is not yet delivering the specialist skills required to create a low and eventually zero carbon built environment in the UK.

Marian Spain, strategy director with the Energy Saving Trust, is among those who have drawn attention to the shortcomings of the present training regime, by highlighting that training is not yet in place for solid wall insulation on existing buildings. Having existing buildings that are better insulated and more airtight is fundamental to reducing carbon emission levels in buildings and achieving the carbon reduction target of 80 per cent by 2050.

The skills available to deliver low and zero carbon buildings are limited; this goes right through the industry from investors, project managers, designers, the workforce and facility managers to those who use buildings.

There is also a need to upskill our energy and carbon knowledge within the procurement, delivery and maintenance of buildings. The introduction of the role of a Carbon Manager would create a position with real power to take responsibility for the carbon performance of a building, both for new-build and existing stock.

Recommendation 4

Defining and creating a role of carbon manager with responsibility for the energy and carbon performance during a building's design, construction and occupancy will give added focus to achieving the necessary carbon targets.

R&D and innovation

As Government has recognised, while there are highly innovative businesses within the construction industry, the sector, with its low margins, has traditionally underinvested. Construction consistently appears near the bottom of tables charting sector investment in R&D. The Government's most recent R&D scoreboard cited an investment of £54 million by 14 firms in construction and materials in 2007.

To accelerate the process of innovation within construction, stronger action is needed to create the funding needed for R&D into low carbon and zero design, construction and use of buildings.

However, innovation need not necessarily involve high-tech responses; in fact low-tech responses can often be preferable for their simplicity.

Recommendation 5

Create an "Innovation fund" where any company from the materials and construction sector can bid for a grant for an audited R&D programme. This could be coordinated by an organisation like the UK Green Building Council.

Whole life costing

This area is fundamental for achieving zero carbon in buildings. **See Willmott Dixon's paper on whole life costs (May 2009).**

The Government's recent procurement documents do not specifically mention whole life costing/life cycle costs, but this has been the focus of attention elsewhere. The Office of Government Commerce Centre for Expertise in Sustainable Procurement has recommended that whole life costing should be considered in projects by public sector clients.

In spite of efforts to embed whole life costing in the procurement process, construction clients in both the public and private sectors continue to make their judgements on the basis of time, capital cost and quality. It is particularly disappointing to note the failure of public sector clients to consider whole life costs, because their long-term ownership and occupation of building stock gives them the greatest potential to reap financial rewards in terms of reduced energy bills and replacement materials.

Recommendation 6

Public procurement models should move away from capital cost to whole life cost, merging budgets for Cap Ex with Op Ex. The UK will only deliver zero carbon buildings where the procurement is on the basis of Whole Life Cost/Life Cycle Cost.

The process of delivering low carbon buildings

In the past two decades the Government has initiated reviews by figures such as Sir Michael Latham and Sir John Egan to increase efficiency in the construction industry and improve management of construction projects. Although progress has been made, today's practice is still not geared to delivering sustainable outcomes in the most efficient way. Clients and construction companies need to look to new models, capable of delivering the most sustainable operating environment, whether by constructing a new building, re-modelling an existing one, or by ensuring that premises operate to optimum efficiency.

To deliver a building that is sustainable throughout its life cycle, a more integrated approach must be adopted, specifically:

- Early involvement of contractor and end user alongside consultant team can help realise low carbon at design stage.
- In most construction companies, the sustainability manager has a facilitation role, rather than power to drive change. Carbon management needs to be a high level role, on the same basis as the financial manager or the project manager.
- Once the building is complete, day-to-day running is generally in the hands of facilities managers with no involvement in delivery. A new model would give a **single organisation** whole life responsibility for a building, ensuring a low carbon approach to design, construction, fit-out, maintenance, refurbishment and even demolition or remodelling. The Private Finance Initiative provides a model for this approach, but this can be improved.

Recommendation 7

The Government needs to develop new procurement models that go beyond PFI; these would allow companies to provide a whole life service with responsibility for carbon management of that building. This would encourage early involvement of the carbon manager in the design stages.

Measuring carbon performance post occupancy

The sustainability performance of our built environment is set and assessed using a range of tools including: BREEAM, Code for Sustainable Homes, Energy Performance Certificates (**EPCs**) and Display Energy Certificates (**DECs**).

However, evaluation of the environmental performance of a building when occupied remains new and is still evolving. The sector does not yet have a body of evidence to show how pre-built modelled performance levels compare with reality post occupation.

Post occupancy evaluation (**POE**) allows this evidence to be gathered, as it involves monitoring the performance of a building in use.

Recommendation 8

POE at one, three and five years after handover must be routine for public sector buildings, with its findings (including what worked, what did not and costs) made publicly available to help the learning the industry needs to deliver a low carbon built environment.

Energy efficiency of a building is demonstrated by the means of the EU Energy Performance of Buildings Directive, which includes the visual display in property of EPCs and DECs.

The EU published proposals to recast this directive and a consultation was launched in July 2009 by DCLG. There is one anomaly in the EU's proposals which appears to have the support of our Government. It suggests that all commercial buildings larger than 250m2 such as shops, restaurants and other buildings frequented by the public should display an EPC, the rating they received when the building was built, sold or leased. However, only public buildings of **more than 1,000m2** need display a DEC.

While EPCs only show the *theoretical* energy performance of buildings based on standardised data and assumptions, they rarely reflect true energy performance. Only DECs do this.

Recommendation 9

Government must extend the threshold for DECs beyond public buildings of more than 1,000m2 to all commercial buildings of similar size thereby ensuring that hotels, supermarkets and privately owned buildings visited frequently by the public tell the truth every year about their actual energy performance.

Conclusion

There are nearly 200,000 companies working in the built environment, yet it is likely that only a handful are really taking firm action on making the industry, and the built environment it produces, low carbon.

It will need client and Government leadership to take the next step.

Construction has the potential to make the significant contribution to carbon reduction in the UK and has shown an ability to take on the challenges of low and zero carbon by delivering on the targets set in the Strategy for Sustainable Construction.

The review announced by Lord Mandelson provides an opportunity to ensure that the industry can deliver a low carbon built environment.

Taking up some or all of these recommendations will further help this process and create real momentum for the necessary step change that is required now in order that the UK hits its 2020 carbon reduction target.

Contacts

For further information on any aspect of this paper, please contact Andrew Geldard, Head of Communications for Willmott Dixon, on 01462 448415 or on *Andrew.Geldard@willmottdixongroup.co.uk*