



Sustainability, climate change and carbon footprint

Seminar 140 held at 4 Hamilton Place, London
19th March 2008

Summary

Introduction

Sustainability has come to the fore in recent years as a requirement of project performance. Stakeholders, including society at large, are making new and urgent demands to have sustainability built in from the very start – from initial build through to lifetime operation and final disposal.

The seminar focused on the premise that climate change poses a fundamental threat to the planet – not in the next 500–1,000 years, but within the foreseeable future. As concluded in the Al Gore lecture ‘An Inconvenient Truth’, and the [Stern report](#). report and [World Wildlife Fund \(WWF\)](#) information, fossil fuel use is the principal driver of this change, which is taking the world towards a tipping point.

Chairman of the seminar, Keith Clarke, Chief Executive of Atkins, challenged the audience by stating that this argument should be accepted, and that a remedial strategy is required as a matter of urgency. The issues raised are many and complex, but he proposed that MPA members involved in the built environment are in a position to influence the move towards a carbon neutral environment in one way or another. For instance, members should ask their clients: ‘Is your project carbon critical?’, rather than ‘Is your project cost effective?’

The seminar looked at how MPA members contribute to the carbon footprint and climate change, what could be done to lessen these impacts, and what factors affect decisions and behaviours. Presenters included representatives from the fields of government, economics, law, architecture and design.

Value for money through whole-life informed decision making

The Office of Government Commerce (OGC) explored the concept of value for money and the role of the [Green Book](#), which sets out the rules on project investment and appraisals. The purpose of the Green Book is to ensure that no policy, programme or project is adopted without first having the answer to the following questions:

- Are there better ways to achieve this objective?
- Are there better uses for these resources?

Whole-life value is the optimum combination of whole-life costs and whole-life benefits; these costs take into account both capital, operational and maintenance expenditure. It was noted that whilst the issue of whole-life costs is usually taken into account, the planned benefits to be delivered are not always fully considered over the same period – these are not just the tangible asset and its use, but its material effect on the business and society as a whole.

The OGC explored what whole-life value means in practice from a government perspective, looking at the need to balance investment decisions and why consideration of whole-life costs is a crucial aspect of effective decision making. It was noted that the issues surrounding carbon are not only integral parts of investment decisions, but are component parts of a bigger picture that should also look at other principles of sustainable procurement.

Some of the key drivers and influences were considered, and how these can be difficult to specify in the context of sustainability and climate change. The presentation concluded with an overview of relevant government and EU sustainability initiatives and directives.

Living with carbon prices

Putting a price on carbon – through a carbon tax or a cap-and-trade system – has been widely accepted as the most effective economic instrument to reduce CO₂ emissions. The second presentation, from Vivid Economics, provided insights into the effects of carbon prices on product prices, profitability, market structure, consumer behaviour and innovation, and its role alongside other policies designed to tackle climate change.

Three main questions were addressed:

- Where is carbon pricing found in the economy?
- What effect does it have on the economy?
- What is its present level, and at what level might it be in the future?

Carbon prices are now embedded in many products, and with the exception of residential households, a large proportion of the economy is facing some kind of carbon pricing, for instance through the EU Emissions Trading Scheme (EU ETS). The different ways of passing this on through final product prices was described, with a detailed examination of the interaction between oil and carbon pricing.

The effect of carbon pricing on production was discussed, and how it might affect investment in both the private and public sectors. It was explained why a squeeze on CO₂ emissions in Europe can produce an increased emission somewhere else; known as carbon leakage this is one of the key metrics of the effect of carbon pricing.

In relation to the built environment, the infrastructure currently under construction will last some 25–50 years. Over the next 40 years the greater part of the economy must be decarbonised, but even if all new infrastructure is zero carbon, it is unlikely that this target could be achieved. The following questions were posed:

- Will the present building regulations deliver new build to the required specification?
- Is public procurement delivering new build that complies with zero carbon standards?
- Will current design engineering get us on track to deliver that objective?

Current issues in emissions trading

An associate from Herbert Smith LLP provided a brief insight into the history of emissions trading and the development of the European Emissions Trading Scheme (EU ETS). This is generally recognised to be the largest greenhouse gas emission trading scheme in the world, and as at March 2008 included about 7,300 companies and 12,000 individual plants in six industrial sectors in EU-25 (the EU membership minus Romania and Bulgaria).

Started in 2005, the EU ETS is intended to allow EU member states to fulfil joint obligations under the 1997 Kyoto Protocol by means of a cap-and-trade system, which involves putting a limit on total carbon emissions. The EU ETS and Kyoto Protocol are linked, and mechanisms for carbon credits generated by Kyoto project arrangements can count as allowances under the EU ETS.

The operation and terminology of the EU ETS were explained, followed by an overview of the impact of the scheme and some of the lessons learned in the first phase (2005–07). In essence, companies are issued with emission permits and hold credits which represent their rights to emit a specific amount of CO₂. The total held cannot exceed the cap; companies needing to increase their emissions must purchase credits from those using less.

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Any company exceeding its limit must pay a penalty or buy additional credits to make up the difference, while excess credits must be surrendered. The penalty for non-compliance is designed to act as a market ceiling, by being higher than the carbon price. In January 2008 it was raised from €40 to €100 per tonne of CO₂ (or equivalent).

In January 2008 the [European Commission proposed a review](#) and expansion of the EU ETS. The proposals of the review were outlined, and the relationship between the EU ETS and any future international agreements discussed.

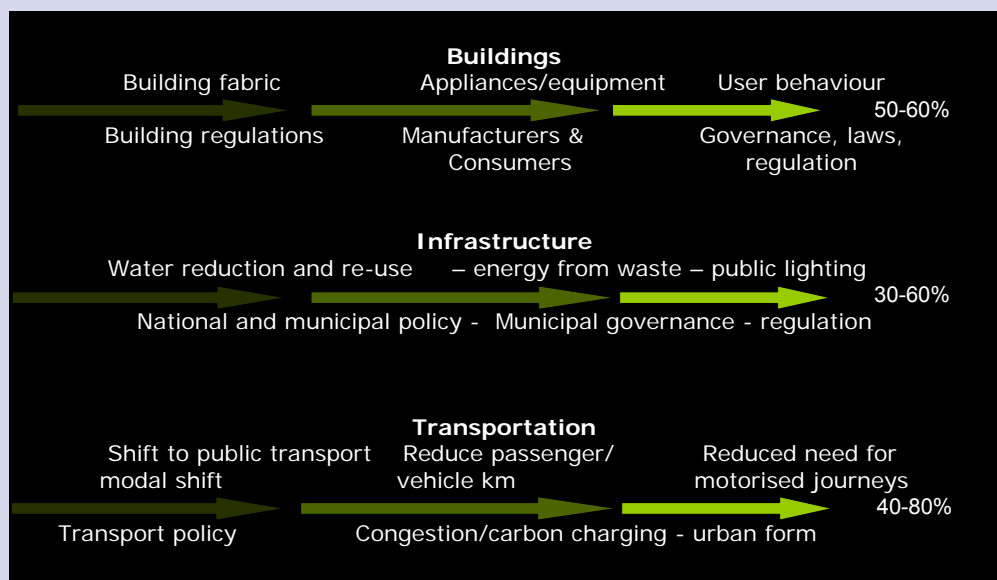
The place of urban design in achieving global carbon targets

There is a first-order link between the development of the world's major cities and conurbations and the consumption of the earth's natural resources. This accelerated consumption, in turn, is directly linked to the increase in atmospheric greenhouse gases and the potential for catastrophic climate change. Thus urban design is a pivotal issue in terms of meeting carbon targets.

The presentation from Arup considered the nature and distribution of energy consumption across the different sectors of activity in existing cities, what needs to be achieved in the design of future cities if targets for carbon emission reduction are to be met, and the economic impact of adopting a more carbon-conscious approach to urban design.

The ability of free-market economics to deal with environmental issues adequately was questioned, and the need for some form of intervention discussed. For instance, in the UK, the drive towards reduced energy use in buildings, infrastructure and transportation requires intervention in key areas and at different levels of governance. The following diagram shows some practical urban reduction targets and intervention at government, local authority or city administration level.

Practical energy reduction target hierarchy



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With regard to residential design there is good evidence that government intervention has made a significant difference, and that new build regulations are driving down the energy consumption required for space heating; the cost of building has increased as a direct result, but with unarguable benefits in terms of energy efficiency. The practicalities and economics of government targets for zero carbon new build homes post 2016 were outlined.

Some of the issues involved in the design and development of new eco-cities throughout the world was discussed, such as the need to think holistically and balance the environmental factors. Again, the question of governmental involvement is relevant:

- How far should private enterprise intrude into the public and social realm?
- What should the relationship be between the developer and the municipality or other statutory authorities?

The presentation concluded with discussion about the mechanisms available for setting carbon prices, and the rates at which prices might have to be set in order to change the design parameters for infrastructure and zero carbon buildings, or to limit car usage.

Creating a low carbon construction industry in the UK

The first low carbon building was constructed in 1975 but there are still only a handful of low carbon developments in the UK. Since the built environment is responsible for a major part of the total UK CO₂ emissions, a low carbon construction industry in the UK is an essential element in creating a low carbon economy. Looking at government policy and the role of industry, Turner and Townsend explored some of the reasons why this still appears to be a long way on the horizon,

The energy consumption for heating and power in an average sized 2–3 bedroom house was discussed, and the definition of 'low carbon' considered. It was suggested that while working to the 2006 building regulations gives marginally improved best practice, the regulations avoid key low carbon issues in construction. The solution to the challenge of sustainability is in adopting good quality design coupled to quality and a professional skill base. However, concern was expressed about whether construction standards in the UK are able to match good design.

The characteristics of 'BedZED', a development of new houses and flats in Beddington, Sutton, based on [zedstandards \(zero \(fossil\) energy development\)](#) were described. Best practice is now a reality for 'closed loop' energy housing developments giving high thermal efficiency, as has been practised in parts of Northern Europe, such as Sweden and Denmark, for some time.

The maxim for good low carbon development is to 'design from the outside in' in terms of energy efficiency, and only when the overall concept is in place should wind power, electricity generation or solar heating be considered. The importance of effective post-construction management was stressed – sustainable construction cannot be divorced from the economics of operation.

Dealing with the realities of climate change

The final presentation, from the University of East Anglia (UEA), examined the ways in which humans relate to the planet and impact on the bio-system, and discussed some of the science underpinning the probability of the effects of climate change. Some of the extraordinary changes that the Earth has undergone in its lifetime were outlined, with examples of the Earth's ability to self-regulate and recover. For instance, some 300 million years ago, because of too much carbon in the atmosphere the Earth began to overheat; this carbon was sequestered into coal, oil and gas.

Over the last few hundred years humans have injected much of that CO₂ from fossil fuels back into the atmosphere, and are continuing to do so. Although some of this is being reabsorbed, the amount of CO₂ in the atmosphere is increasing, and the potential consequences of this on the Earth's system were described.

Studies by earth scientists, based on huge databases of observations and modelling, suggest that the planet might pass beyond a number of simultaneous 'tipping points' before the end of the century. Many of these relate to climate change, one of the most immediate being the melting of the Greenland ice sheet, which could raise sea levels by an average of one metre within 10 years, with colossal impacts worldwide on economies and societies. Ultimately, the effects of climate change could mean that while the Earth would almost certainly adapt as it has done in the past, the human species would be eradicated in the process.

The challenge is to adjust to a low carbon society that accepts the major shifts in technology and behaviour in a timescale that is frighteningly short for a cultural change of this magnitude. The presentation looked in detail at how and why the UK is failing to meet this challenge, and proposed a general strategy to be followed:

Recognise that tipping points are realistic and irreversible in the lifetime of those born today.

- Ask the Climate Change Committee to work with business and regulators to set prices, taxes and incentives to ensure a low carbon, sustainable economy.
- Begin a consistent dialogue with electors and schools to create a vision of a successful transition to a low carbon, sustainable future.
- Enable all schools to follow a low carbon sustainable way of life so that every citizen of the future experiences the transition.
- Introduce the meaning of virtue in citizenship education in schools, so that everyone is aware of their responsibilities and obligations, and wishes to work with others.
- Encourage and roll out cohesive community-based low carbon sustainable initiatives, particularly for buildings.
- Begin experimentations with personal carbon allowance and trading schemes, so that the practicalities and social justice issues are fully explored before implementation.

Conclusion

The seminar provided much food for thought on the issues surrounding sustainability, in particular the impact of carbon emissions and how they might be mitigated.

There were some clear lessons that should be taken on board by everyone as a matter of urgency:

- This is a very serious problem and a challenge of immense scale.
- It is vital to put sustainability at the core of company/project strategy.
- It is important to work even more closely with clients and procuring authorities to develop a step change in the objectives of planned developments.
- All those involved in major projects have a professional obligation to promote engagement on this topic, both with other disciplines and to politicians.

Participating organisations

Advance Consultancy Ltd
Arup
Atkins plc
BAA plc
BBC Projects
Bircham Dyson Bell
Bovis Lend Lease
British Energy
Centre for Research in the Management
of Projects (UCL/UoM)
CMS Cameron McKenna LLP
EA Consulting
EC Harris LLP
Emcor Rail Ltd
Ernst & Young LLP
Freshfields Bruckhaus Deringer
Halcrow
Henley Management College
Herbert Smith
Highways Agency
Imperial College London
John Laing plc
KPMG LLP
Lockheed Martin
London 2012 Programme
London Overground Rail Operations Ltd
Major Projects Association
Mott MacDonald Group Ltd
National Audit Office
NUKEM
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Sustainable Development Commission
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