Written Evidence Submission from
The Chartered Institution of Building Services Engineers
to
the All Party Parliamentary Urban Development Group inquiry - May 2008
Climate Change and the Urban Built Environment
Reducing the environmental impact of existing non-domestic buildings

About CIBSE

This submission is from the Chartered Institution of Building Services Engineers (CIBSE), a professional institution incorporated by Royal Charter. CIBSE exists to promote the art, science and practice of building services engineering for the benefit of all, and the advancement of education and research in building services engineering. CIBSE is dedicated to the development of better buildings by the production of guidance on the design and maintenance of heating, cooling, ventilation, lighting, lifts and other energy using systems in buildings as well as installation and commissioning. The Institution maintains a close relationship with manufacturers to ensure high standards and an active role in contributing to governmental consultations and development of legislation. Building services expertise has been required to provide renewable energy in buildings and from this position building services engineers have emerged as the professionals that are consulted typically when expertise is sought on a planning and master planning basis.

This evidence has been prepared by Dr Hywel Davies, CIBSE Technical Director and Mr Brian Mark FCIBSE and Member of the BERR Renewables Advisory Board, of Fulcrum Consulting. CIBSE has nominated two members to attend the evidence session on 12th May to give further evidence: Mr Rob Manning of Faber Maunsell and Mr Brian Mark of Fulcrum Consulting.

Requirements for improved energy performance of buildings have brought building services to the forefront in recent years. CIBSE members are essential for designing and then managing the energy using systems in the built environment. We have to provide them as well now for zero carbon. Whilst new buildings are increasing energy efficient it is imperative that the energy performance of the existing non-domestic building stock be addressed if the UK is to meet EU and government targets for reduction of carbon emissions from the built environment.

The Institution is committed to tackling climate change and requires its members to ‘have due regard to environmental issues in carrying out their professional duties’ under its Code of Conduct. CIBSE has taken a leadership role in a project to reduce the carbon emissions from our own headquarters by 60% and seeks to improve the construction industry and the existing built environment through support of legislation and collaboration with relevant other bodies.

CIBSE has close dealings with CLG and BERR and is advising on the impact of legislation emanating from the EU. We have also addressed the corporate social responsibility agenda and responded to an increasing demand for energy efficiency from companies acting independently of regulation. Through our "100 Days of Carbon Clean-up Campaigns" we have been able to provide help for over 700 companies looking to improve energy efficiency and sustainability for their existing portfolios. CIBSE has developed guidance and, crucially, measurement methodologies for energy use in buildings that have been adopted nationally.

CIBSE has recently given both written and oral evidence to the CLG Inquiry and Call for Evidence on Existing Housing Stock and Climate Change Session 2006-07. As stated in CIBSE's evidence to the CLG Committee, we are keen to participate fully in any future inquiry into the energy performance of the existing non-domestic buildings. We therefore welcome this inquiry.

So much effort has been made to ensure that new build is as efficient as it can be but even once new build joins the ranks of the existing stock, the proportion of the existing stock that is old and poor in terms of energy performance will remain high. Older existing stock has potential for improvement but the use of this stock may have been changed many times and it will be a challenge to find cost-effective ways of retrofitting it.

Barriers to reducing emissions from urban buildings:

Lack of information

How good is the data that owners/occupiers have about their energy usage, efficiency and carbon footprint?

The new Energy Performance Certificates and Display Energy Certificates under the Energy Performance of Buildings Regulations (from the EU Directive) will provide recommendations for improvements to a building's performance that can then be used to make decisions. Building owners may choose to make these improvements or the demand will come from tenants. This is a potentially powerful tool for the market to facilitate improvement of existing building stock.

At present there are a number of measurement methodologies for energy usage. The introduction of energy performance certificates (EPCs) across the board for buildings for sale or rent will provide 'asset rating' data on how a building should perform according to how it has been designed. However data on energy usage – the operational rating - will only apply to public buildings. An operational rating gives data on how efficiently the energy is being used and this is why CIBSE is encouraging businesses to obtain voluntary operational ratings to complement their energy performance certificate and calling for wider rollout of Display Energy Certificates. Only an asset rating and an operational rating will provide the full picture of how a building is performing and allow feedback to inform and improve future designs and operational management. Techniques to provide sustainable zero carbon building to meet the CLG target of zero carbon only new homes by 2016, all buildings by 2019.

Many recent low carbon buildings have not performed as well as intended when monitored. Feedback is essential to reverse this.

How far are they able to benchmark their performance against that of others?
The Display Energy Certificate (for public buildings) will have benchmarking information and CIBSE has been instrumental in developing this information and disseminating it. Whilst this does not exist for EPCs at the moment the CLG and certification scheme operators such as CIBSE will be able to access general data from national database on which all certificates are logged. This will enable benchmarking information from confidential sources to be built up and made available.

The CIBSE Low Carbon Consultants register requires its members to provide information on the carbon savings their designs achieve over and above regulation. This was a requirement of the grant funding from the Carbon Trust and it is beginning to build up a valuable picture. This picture would be even more valuable if applied to all buildings. CIBSE calls for a national database for energy bills to be logged so that actual performance can be tracked against intended performance.

If owners/occupiers lack data about their building's energy usage, what is preventing them from getting it?
Utility companies are now required to provide information on energy use. The abolition of estimated readings would be a major step forward in enabling building owners/operators to understand their energy use. Smart meters provide regular readings at times suited to the building operator. The way older buildings have been designed may pose a problem to installing meaningful metering and this is an engineering issue that CIBSE can help to solve.

There have been significant developments in monitoring and controls for buildings – many large buildings now have building management systems with facilities managers able to access real time energy usage readings in building zones. This enables them to identify unexpectedly high usage of energy and make corrections to behaviour or improvements to plant or fabric. Part L of the Building Regulations will in the long term bring in the requirement for building log books (for existing building stock these unfortunately often do not exist). Part L will also require consequential improvements to the energy performance of a building when major refurbishment is planned.

CIBSE's own project to reduce carbon emissions from our own HQ by 60% has highlighted the importance of information and we have installed a system that allows online real-time remote monitoring of our energy use. This has enabled us to identify faults in our equipment and incorrect settings for heating as well as behavioural issues with occupant use. In effect this allows us to "drive" our building and our behavior in it towards ever increasing carbon reduction targets and to understand where we are failing and were we could improve. In this context, by "drive" we mean to use information to correct constantly – information that influences our behaviour.

Costs, benefits and barriers to owners/occupier

Even if a more comprehensive understanding of a building's energy usage could be achieved, what is preventing owners/occupiers from undertaking measures to use energy (heating and electricity) more efficiently or minimise energy wastage?

- Lack of knowledge on how to make cost effective improvements;
- Lack of support at Board level to make improvements that may have a longer payback period than the short or medium term business plan may allow for;
- Lack of skills to analyse the data and take the simple / no-cost measures for improvement or make decisions on what is best to do amidst conflicting advice
- Lack of available access to informed advisors, skills shortage of such advisors
- Proven performance failure of inappropriately early marketed low energy designs that have not worked.
- Lack of dynamic metering to allow users to make decisions on exactly when to take energy – this demand/supply interface could be valuable in promoting a national energy strategy for evening out demand, incentivised by price

What barriers (both economic and physical) do owners/occupiers face when considering the installation of low carbon technologies?

- Some low carbon technologies may require both planning permission and building regulations approval and this can be complicated. CIBSE experienced this recently when attempting to obtain planning permissions to install more energy efficient windows;
- There is currently a lack of experienced designers and installers, particularly those that appreciate the need to integrate one technology with another;
- There is still a lack of knowledge and therefore conflicting views on low and zero carbon technology. Whilst welcoming the boost that "The Merton Rule" gave to consideration of renewable technology, CIBSE has pointed out that more flexibility is needed to allow designers to suggest the most cost-effective solutions in a holistic way, otherwise developers just stick up a wind turbine and say they've satisfied the requirements or even worse, provide a part wood fired plant to achieve planning permission with no real intention of ever using it because the is no need to prove operational compliance with such planning requirements;
- Owners need the confidence that they are getting a satisfactory service from design to completion as customers – this comes from good information that will empower them as customers;
- One of the key issues here is that you don't have owners/occupiers in non-domestic buildings – they are either one of the other. The exception to this is the iconic building commissioned specifically by the owner to be a business headquarters. Wessex Water's iconic building is an example of this – it was built with whole life costing as its basis and is a building that performs well.

Costs/Benefits to the wider economy

How important are the wider urban economic impacts of greening existing buildings?

Hugely important - for reduction of reliance on energy security, to

establish new supply chains in the urban economy, to encourage stability. There is evidence that regional businesses are closing down because of rising energy costs. Cheese making for example which requires a lot of heat, and this leads to local job losses. This could be balanced by a city masterplan for energy. Cities delivering new sustainability policies that will affect the community will benefit the fuel poor.

For businesses maintenance of asset value is becoming more important and this includes ability to save and generate energy. Land values operate on lagging information (at least four years) which is a long time in sustainability terms. Valuers could be encouraged to value taking into account sustainable measures.

Any local energy measures must interface with EEC, CERT and supplier obligation.

District heating is ideal for urban areas and existing stock could be retrofitted. Now that almost all of the options for greening existing building stock have now been covered DH is almost the only option for reducing carbon emissions in urban areas. Because new buildings do not use much heat because they are all being built to LZC requirements district heating will have a high capital cost, making it potentially uneconomic. However this is a decision government may have to make – to pay for district heating in order to meet emissions targets.

Existing buildings have to be eager future customers of urban district heating fed by CHP. The EU Renewables Directive does not distinguish between heat and energy and CIBSE is concerned by this as energy efficiency is no longer a driver – the driver now being heat – which could be wasted as long as it is being supplied from renewable sources.

There are other wider urban economic impacts. 'Green buildings' are typically more comfortable to be in and provide a 'feel good' factor to users and visitors – in many cases this can be measured.

A green building often has the capacity to provide energy to adjoining buildings and many 'green projects' could be utilised in encouraging greening of existing stock. These projects will already be covering such elements as safety & security, access for all, improving the local economy and citizen empowerment. Organisations such as the Academy for Sustainable Communities as part of the Homes and Communities Agency could take a lead.

Existing stock can be 'greened' in imaginative ways and whilst some measures could be complicated and costly other measures are more straightforward - utilising passive design methods to save energy will have the effect of reducing the urban heat island effect.

Not only businesses but whole cities can be seen to be acting and those that act quickly can claim the brand – in the same way that Eco towns will – cities now have a responsibility to meet energy requirements and energy will increasingly inform decisions

– not always in a beneficial way – for example in competing for a piece of brownfield development land a business complex would provide employment for many people but an application for a storage unit (which only employs a few people) might be granted permission over and above the other application because it is will be using less energy. This may not be good for the wider community.

The majority of commercial property is occupied. A full scale retrofit would require temporary relocation for the occupants, with potential profit losses for the landlords and disruption to tenants' businesses. What are the likely impacts on cities' economies (for example in terms of job creation and business opportunities/costs in the property industry and other business sectors)?
External insulation does not stop business and most retrofit is intervention to the outside skin of the building (eg p.v.) – not too disruptive and certainly less disruptive to business than sending everyone home in a heatwave or dealing with sewage in the water supply following a flood.

Building services plant has on average a 20 year lifecycle so building services engineers are skilled at renewing plant with the minimum of disruption – it can be done. CIBSE has undertaken some major work to reduce its carbon emissions by 60% without closing any offices or adversely affecting workplace activities.

There is also a natural cycle of refurbishment and retrofit for all buildings. Regulation and incentive should dovetail into this. Government could sponsor a useful exercise in analyzing whether integrating a programme of improving the energy efficiency of existing buildings into this natural cycle would achieve targets in time. This might provide some quantitative data as to how much reliance should be placed on this natural cycle.

Any improvements have to integrate with existing policies such as CERT to minimise duplication. Whether by incentive or regulation businesses need a level playing field – for example, in the forthcoming review of part L of the Building Regulations (Conservation of Fuel and power (in buildings). There is scope for the requirements for consequential improvements to buildings under part L to be enhanced. If all businesses are required by Building Regulations to improve their energy efficiency if they undertake major refurbishment then they will. It may be necessary to consider different types of businesses differently – eg public facing businesses such as retail, leisure and hotels as opposed to manufacturing or service providers. It may be possible to do something in conjunction with the Energy Performance of Buildings Regulations widening the requirement for Display Energy Certificates (DECs) and bringing in requirements for businesses to act on the improvement recommendations. Consideration is already being given at European level as to whether to roll out DECs to this type of building and this is something that CISBE supports.

Breaking down barriers to 'greening' urban buildings:

Addressing the lack of information

What actions are needed at the industry level to produce the measurement standards needed? How can the Government support the industry in achieving this?
Simple methodologies, smart meters, easily available import/export meters, accurate bills, Carbon Reduction Commitment, strengthening Part L to increase the requirements for consequential improvements, improving the likelihood of improvements resulting from EPCs and DECs, proper enforcement and compliance.

Are there any current tools that could be adopted to improve energy measurement?
The methodology for energy performance certificates seems the most obvious one – at present EPCs for existing buildings are triggered by sale or rent. If businesses wish to measure their energy performance outside these triggers, using the same methodology would enable them to produce 'voluntary EPCs' something the government is already keen to encourage. A few industry leaders using this methodology outside the official 'trigger events' would perhaps encourage other property owners/occupiers to follow suit.

CIBSE's work with the British Property Federation to develop the LES-TER project (Landlords Energy Statement – Tenants Energy Review) should address the issues of responsibility for energy information between commercial landlord and tenant.

As mentioned elsewhere, it is essential that we have operational ratings as well as asset ratings to give a true picture of what is happening with energy performance.

It is looking increasingly likely that the European Co-generation Directive will make it compulsory to use the most effective energy source and in many instances this could well turn out to be district heating from CHP plant utilising urban waste.

Addressing economic consequence
If owners/occupiers face barriers to more efficient use of current energy sources, what policy changes would allow them to overcome these barriers?
Insist that they do it and demonstrate that there is a level playing field and a benefit to the business. Extra help for small businesses whether it be advice, business support or grants would be helpful and would also demonstrate a key government social commitment. Feed-in tariffs could be used as an incentive to take up microgeneration.

What are the comparative merits of regulation, market mechanisms, fiscal incentives/penalties and educational awareness campaigns?
We must have a level playing field for all to engage. Regulation first and fiscal incentives second. We have had 30 years of market mechanism and educational awareness. Education is important however – the decision makers of the future are now in school.

Monitoring and enforcement
How should policies to ensure carbon reduction be enforced?
Through building regulations and possibly the planning system. Building Control now has a remit for post occupation audit but this rarely happens. Building Control Departments should be adequately funded and building control officers trained to

undertake these audits so that developers come to expect it. Commercial engineers will then be able to tell clients with confidence that they must comply with regulations and must expect a post occupancy audit visit.

The next iteration of the energy Performance of Buildings Directive looks likely to bring in requirements for improvement of buildings. At present the Directive only requires information and improvement recommendations but no obligation to act on them.

The planning system could be used to introduce a requirement for energy performance improvement modelled on the requirements for heritage buildings. At present refurbishment of heritage buildings is strictly controlled to preserve historical significance and the 'look and feel' of a place. Improvement of energy performance is still open to arguments as to what is cost effective – if we can be draconian about heritage buildings can we afford not to be more draconian about energy efficiency?

What is the most effective level of intervention for different policy options?
National, regional and local – as appropriate – it should be the route of least resistance – nothing else will deliver fast enough. National guidelines would give local policy a steer.

Should it be addressed mostly through the planning system?
If this is the most straightforward way. Local planning can include requirements for greening existing buildings as a part of gaining planning consent – similar to the Section 106 Agreements for providing affordable housing. The reaction of developers to 'the Merton Rule' has demonstrated that what they need most is a level playing field. National guidance that allows local planners to find the best way forward would provide this.

Should they sit at national or city level? How can city leaders together with the private sector help deliver greener buildings?

Regulation to reduce demand side consumption should sit at national level as currently exemplified by the implementation of Part L, EPCs, DECs and taking the broader perspective of managing scarce energy resources, city leaders should work with the private sector to investigate local options to be more carbon effective in delivering primary energy to buildings.

A consistent message from all government departments would be very useful. Energy policy is fragmented and this needs to be addressed.