



What will a “Zero Carbon” Building look like?

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Our low carbon future...



is suspiciously like our hi-carb past!



New build on the wharf



Improving the new building stock

- Part L 2006 – delivers a 40% reduction in carbon emissions compared to 1995 levels
- Zero carbon dwellings from 2016 – or is it by 2016?
- Energy performance certificates – deliver ratings of new buildings
- Code for Sustainable Homes – delivering lower carbon homes

So what's the problem?

The scale of the existing problem

- Buildings in UK account for 46% of total carbon emissions
- New buildings account for approximately 1% of the stock each year
- We currently have about 24 million homes in the UK
- We build about 200,000 new homes a year – 120 years to replace the existing stock
- We currently demolish about 20,000 homes a year – 1200 years to demolish the existing stock
- Our existing stock is the challenge if we are to reduce emissions from buildings

The relative emissions of new and existing stock

- The built environment accounts for 46% of total UK emissions
- So reducing emissions from new build by 40% reduces UK emissions by

0.4 x 0.46% per annum

which is 0.18% of UK total

- And we want to reduce emissions by 60-80% by 2050?

The scale of the existing stock challenge

- 24 million homes now
- We demolish 20,000 a year
- We are currently building 100,000 a year – lets be really optimistic and assume we achieve the Prescott target of 200,000 from 2011 on
- So, by 2050 we will have built 8 million new homes and demolished 800,000.
- Net housing stock in 2050 – $24\text{m} + 8\text{m} - 800,000 = 31.2\text{m}$
- But 23.2m of them exist now!!
- $60 \text{ minutes} \times 24 \text{ hours} \times 365.25 \text{ days} \times 40 \text{ years} = 21,038,400$
- In other words, we need to refurbish more than one home a minute every hour of every day of every year for 40 years!!!



Measure energy consumption

- We need to measure actual energy use – honestly which means we need display energy certificates for commercial buildings and accurate metered billing for all dwellings
- We need to look at the state of the building and the way energy is used in it
- We need to manage energy use, addressing behaviour and then looking to improve the fabric



KPMG

Energy Certificate

Category	Value
Category 1	10
Category 2	20
Category 3	30

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ERM YOUNG

Energy Certificate

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Act on the measured energy consumption

- Be mean – reduce demand
- Be lean – use the demand efficiently
- Be clean – employ low or zero carbon energy where possible
- Refurbish for energy efficiency
 - Improve fabric performance
 - Enhance the efficiency of the services
 - COMMISSION THEM!
 - Train building users – the simpler the systems and controls the easier it is to train the users.
 - Monitor and measure actual energy use
 - Use the measured data to identify problems – and tackle them!
- Manage and maintain for efficiency
- Combine all the above to maximise savings

Mind the Gap!

or, what's the difference between an *EPC* and a *DEC*?

Fixed building services & fabric in the base building:

Fixed building services added in occupier's fitout:

Equipment and appliances added in occupier's fitout:

<p>Fixed building services covered by EPCs and Standard Conditions Systems in Part L</p> <p>EPC: Yes</p> <p><i>Heating, hot water, cooling, ventilation and lighting</i></p>	<p>Fixed building services added in fitout, covered by building regs Part L2:</p> <p>EPC: Maybe?</p> <p><i>Extra cooling, ventilation and lighting</i></p>	<p>Normal equipment and appliances:</p> <p>EPC: NO</p> <p><i>Office equipment, electronics, laundry, domestic catering etc</i></p>
<p>Services not covered by building energy regs:</p> <p>EPC: NO</p> <p><i>Lifts, communications, security, emergency and outdoor lighting etc ...</i></p>	<p>Fixed building services added in fitout, not covered by building energy regs:</p> <p>EPC: NO</p> <p><i>Communications, security, machine room cooling etc.</i></p>	<p>Special equipment and services:</p> <p>EPC: NO</p> <p><i>Process equipment, commercial catering, data centre and server rooms ...</i></p>

Future drivers for Building Regulation???

- Greater focus on existing buildings
- New requirements for “major refurbishment”
- Demand for “consequential improvement”
- Regulating energy used by lifts and escalators
- Greater focus on operational energy use
- Increasing pressure to be open and transparent about energy use

**Thanks, but what can I actually DO,
and NOW?**

Energy efficient refurbishment

The following principles apply to new work or to refurbishment:

- Reduce demand
- Meet end use demand efficiently
- Supply from low carbon sources
- Supply from renewable sources
- Commission the systems
- Enable energy management
- Train the users
- Do “Post occupancy evaluation” – “how is it for us”?

Commissioning

What is commissioning

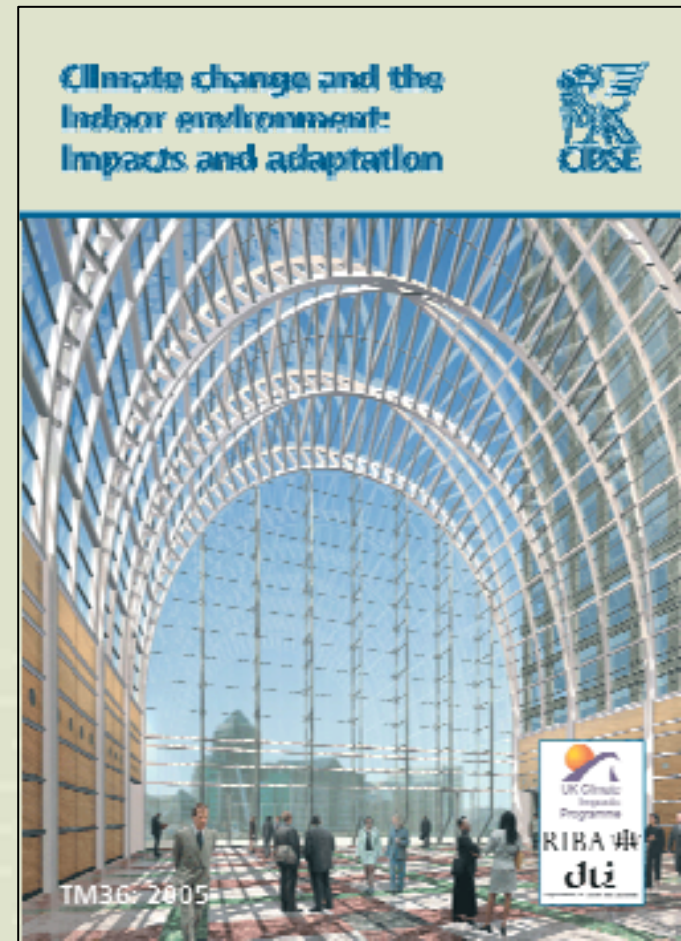
- Setting up the systems to work as they are intended
- One of the last things to be done on a project – handover approaches and the pressure to cut corners is greatest

Part L requires:

- commissioning of fixed building services
- a certificate be presented to Building Control confirming that fixed building services have been commissioned
- following CIBSE Commissioning Codes and BSRIA Commissioning Guides is a means of demonstrating compliance
- **Commissioning is for life, and not just practical completion!**

Adapt to a changing climate

- We need to address the likely impacts of a changing climate on internal environmental conditions:
- CIBSE TM36 gives guidance on mitigation of the effects of rising temperatures in existing buildings
- Gives examples of measures to adapt existing buildings to likely changes in climate, with case studies of the application to existing building types



Water efficiency

If water is going to be the “new carbon” we need to:

- Reduce demand (and waste)
- Meet demand efficiently
- Supply collected rainwater or recycled greywater
- Enable water management

Water uses energy, emits carbon!

The challenge of building the low carbon environment

- The scale of the problem
 - 24 million new homes,
 - 1.5 million commercial buildings
- The scale of the shortages –
 - shortage of time
 - shortage of skills & know how
 - shortage of political will
- The scale of integration needed to deliver

Conclusions

- It's the Existing Stock!
- We need to manage, maintain and improve the existing stock
- There are no magic bullets
- There are lots of smaller steps to take
- Are we up for the opportunity to make a real difference?

The low carbon future



Is already here!!

Thank you for listening