

THE CHALLENGE OF REFURBISHING OUR EXISTING BUILDING STOCK

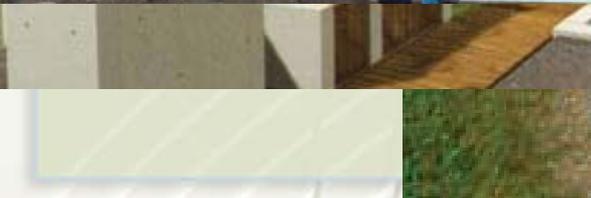
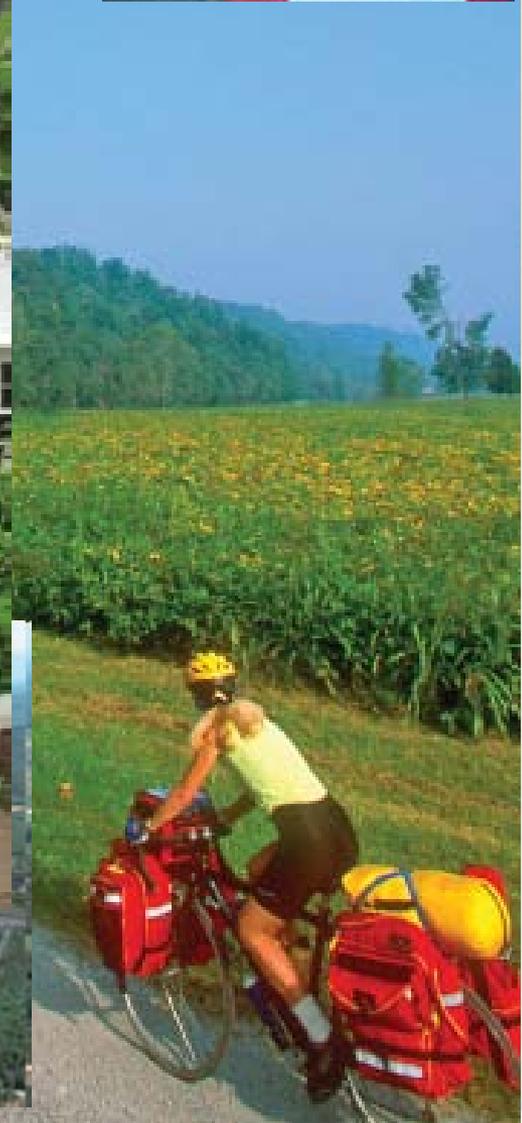
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1 November 2010



Our low carbon future...



is suspiciously like our hi-carb past!

Focus on new build?

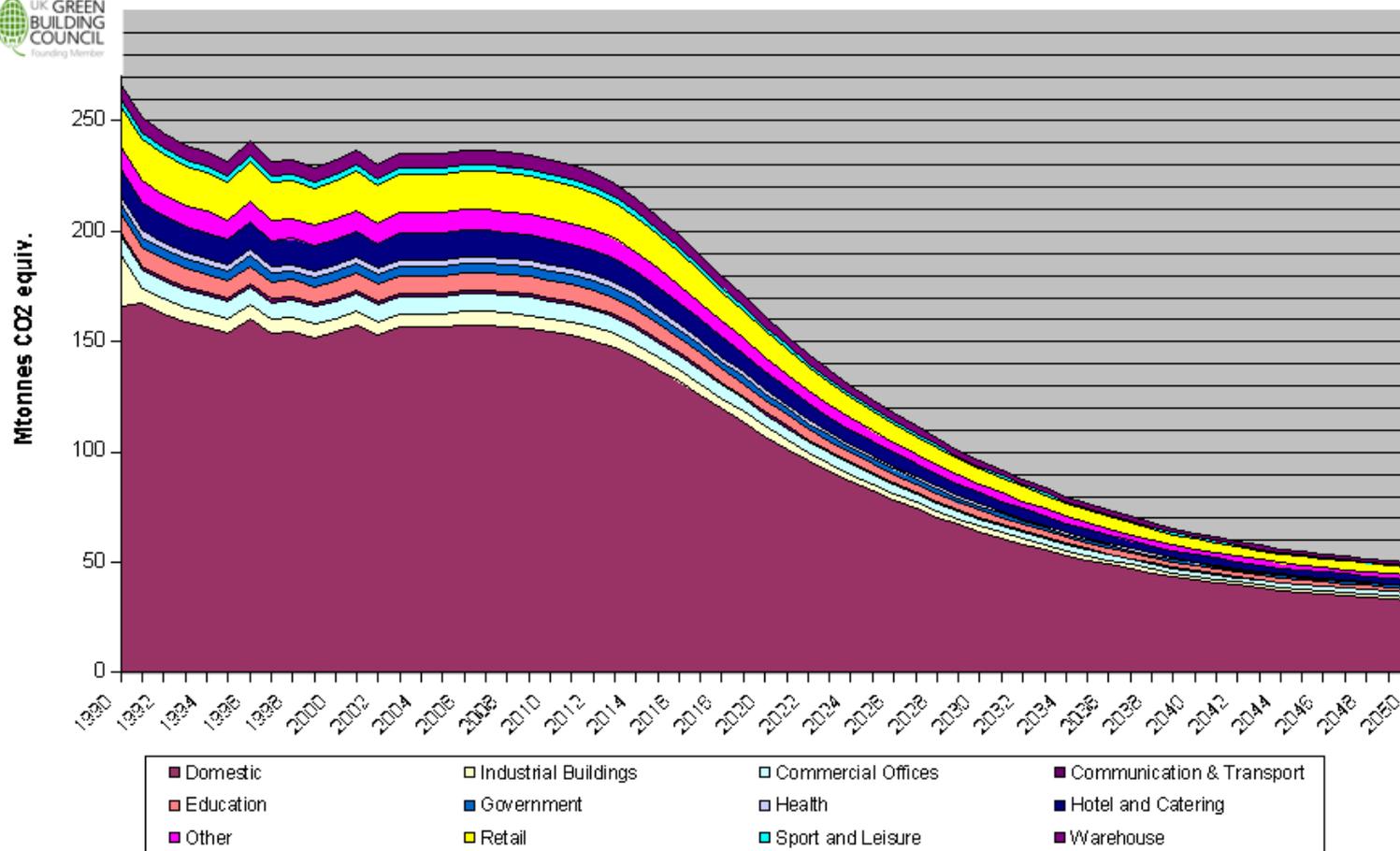


Improving the new building stock

- Part L 2006 – delivers a 40% reduction in carbon emissions compared to 1995 levels
- Part L 2010 – a further 25% aggregate reduction
- Energy performance certificates – deliver ratings of new buildings
- Code for Sustainable Homes – delivering lower carbon homes

So what's the problem?

The Low Carbon Building Diet



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
- If we build 200,000 new homes a year it will take 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

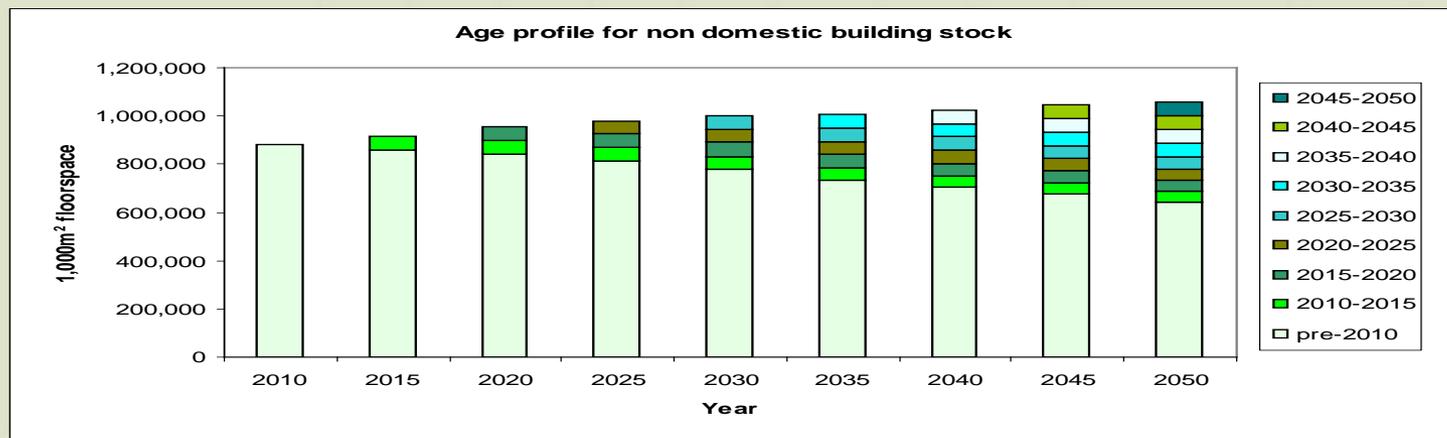
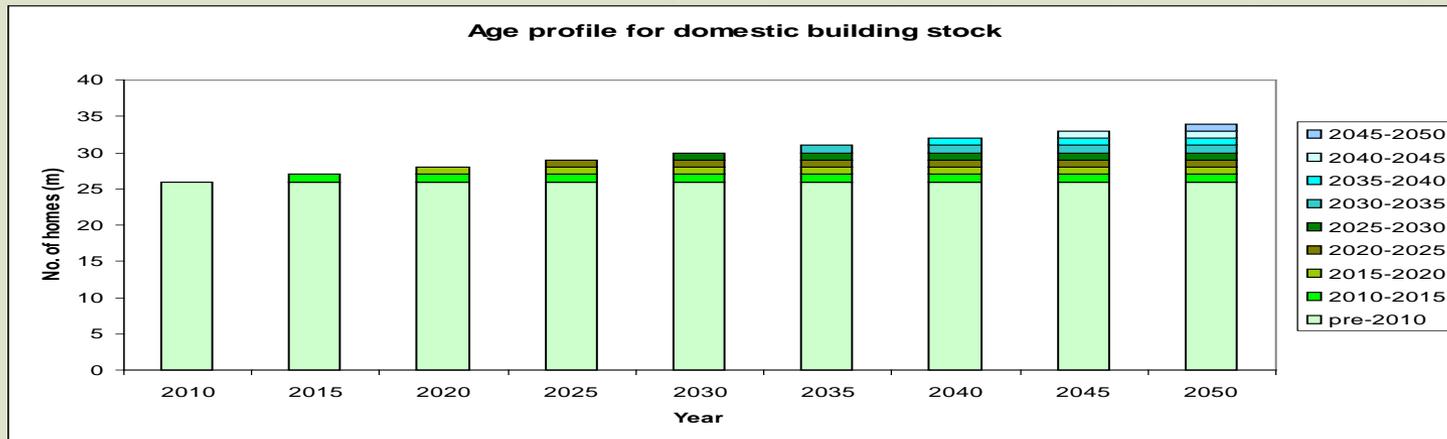
0.4 x 0.46% per annum

which is 0.18% of UK total

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

Importance of existing stock

Important to cut carbon footprint from new build but most buildings in 2050 will still be existing ones i.e. pre 2010 standards



Source: "energy efficiency in new and existing buildings: comparative costs and CO2 savings", BRE Trust

The existing stock challenge

- 24 million homes now
- demolish 20,000, build 100,000 a year
- So, by 2050 we will have built 4 million new homes and demolished 800,000.
- Net housing 2050 stock $24\text{m} + 4\text{m} - 800,000 = 27.2\text{m}$
- But 23.2m of them exist now!!
- 60 minutes x 24 hours x 365.25 days x 40 years = 21,038,400
- **So we need to refurbish more than one home a minute every hour of every day of every year for 40 years!!!**



Existing Buildings – the Elephant in the Room

- We need to reduce energy demand in the existing stock and in new buildings by

Metering, Measuring, Monitoring and demand reduction

re-commissioning buildings

“If you don’t measure it, you can’t manage it”

- We need to renovate and refurbish the existing stock so that it has more energy efficient fabric and services with effective controls, with

Metering, Measuring, Monitoring and demand reduction

Reducing Demand

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

Operational Ratings and DEC's

- What is a Display Energy Certificate?

an indication of actual building energy use compared to typical energy use by similar buildings of that type



- How does it differ from an EPC?

more like mpg than “0-60 in 6 seconds”

tells you how effectively asset is managed

a measure of real operational energy use

DEC Contents

OR (and AR if available)

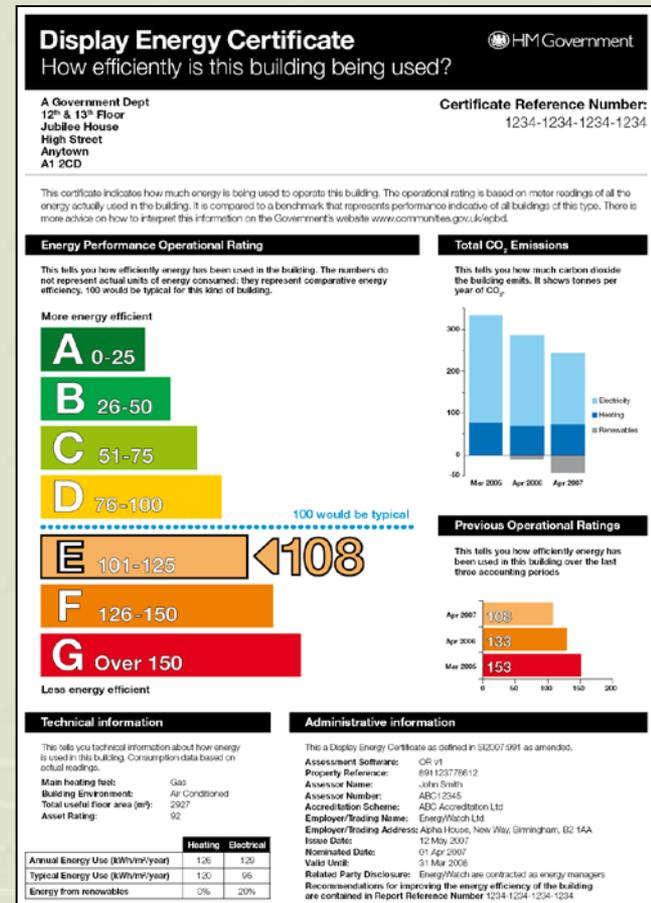
OR for previous two years (showing trends)

Reference value such as current legal standard or benchmark.

DEC reference number, address of building, total useful floor area, name of energy assessor, name of accreditation scheme, date when the DEC was issued etc.

Validity: 12 months.

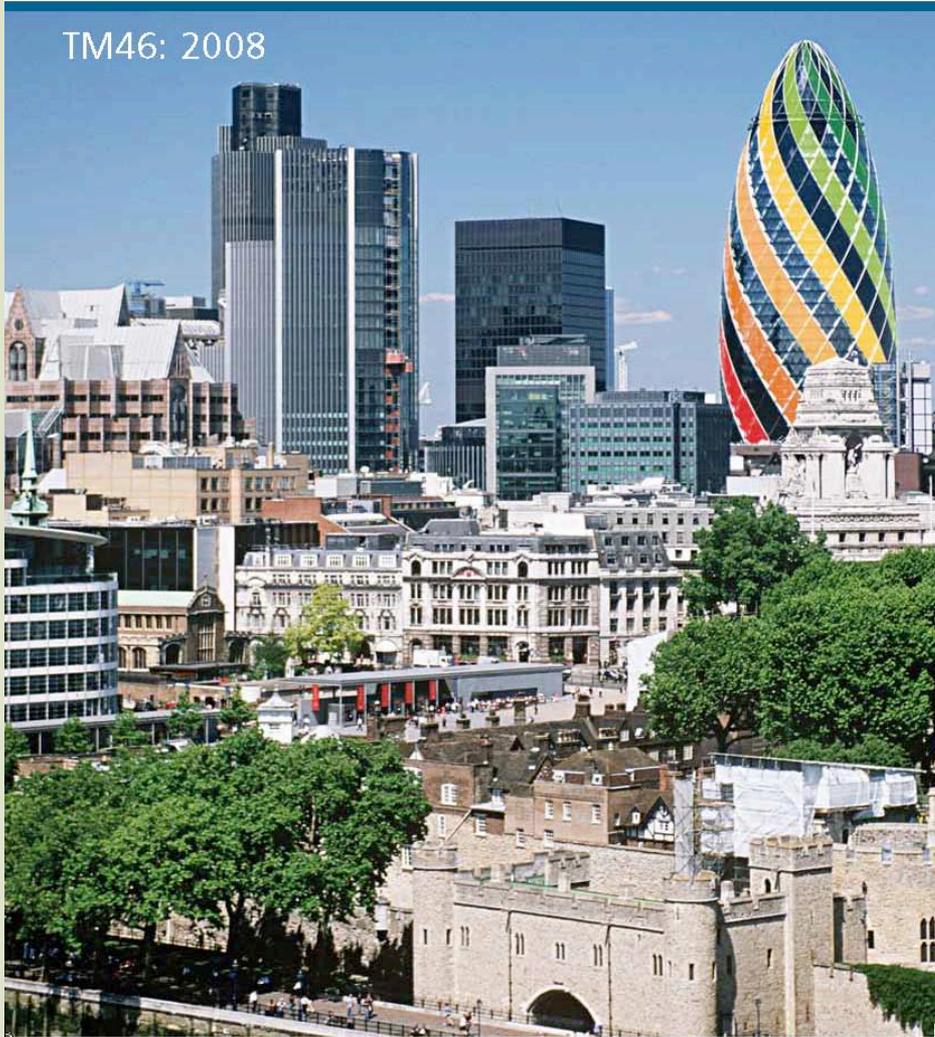
Must be accompanied by an Advisory Report.



Energy benchmarks



TM46: 2008



CIBSE Benchmarks

Based on CIBSE Guide F
and similar data

A basis for comparing
actual energy use of
buildings



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
- Manage and maintain for efficiency and performance
- Combine all the above to maximise savings

Renovating Existing Buildings

Existing Buildings

- Important to cut carbon footprint from new build but most buildings in 2050 will still be existing ones i.e. pre 2010 standards
- General strengthening of replacement standards
- Building Services Compliance Guides set minimum standards for new and replacement services in existing buildings
- Capture more work – e.g. swimming pool basins inside buildings
U-value of 0.25 W/m².K as calculated according to BS EN ISO 13370
- Extensions continue to use elemental approach but can trade-off using area weighted approach or SAP/SBEM for greater flexibility
- Regulation 9 amended to clarify when an extension is a conservatory or porch that is not exempt from the energy efficiency requirements with amended guidance

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

New Building Regulations

STATUTORY INSTRUMENTS	
2010 No. 2214	
BUILDING AND BUILDINGS, ENGLAND AND WALES	
The Building Regulations 2010	
<i>Made</i>	<i>6th September 2010</i>
<i>Laid before Parliament</i>	<i>9th September 2010</i>
<i>Coming into force</i>	<i>1st October 2010</i>
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http://www.legislation.gov.uk/uksi/2010/2214/pdfs/uksi_20102214_en.pdf

The Part L Requirement

Part L Conservation of fuel and power

L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:

a. limiting heat gains and losses:

i. through thermal elements and other parts of the building fabric; and

ii. from pipes, ducts and vessels used for space heating, space cooling and hot water services;

b. providing fixed building services which

i. are energy efficient

ii. have effective controls; and

iii. are commissioned by testing and adjusting as necessary to ensure that they use no more fuel and power than is reasonable in the circumstances.

Source: Building Regulations 2010

Note: The Building Regulations 2010 update the text of requirement L1 as it appears in ADL2A 2010. The Regulation takes precedence.

Renovation and Refurbishment

“renovation” in relation to a thermal element means the provision of a new layer in the thermal element or the replacement of an existing layer, but excludes decorative finishes, and “renovate” shall be construed accordingly;

Giving of a building notice or deposit of plans

12.— (1) This regulation applies to a person who intends to—

- (a) carry out building work;
- (b) replace or renovate a thermal element in a building to which the energy efficiency requirements apply;
- (c) make a change to a building’s energy status; or
- (d) make a material change of use.

(2) Subject to the following provisions of this regulation, a person to whom this regulation applies shall—

- (a) give to the local authority a building notice in accordance with regulation 13; or
- (b) deposit full plans with the local authority in accordance with regulation 14.

Thermal Elements

- Improved standards for new thermal elements
- Guidance clarified when renovating thermal elements
- Adding a new layer or replacing existing layer (rendering or cladding not decorative)
- Triggered by 50% of individual element (individual room when looking from inside, elevation when looking from outside) or 25% of whole envelope
- Guidance on what is considered reasonable upgrade in Appendix A

Consequential Improvements

- For existing buildings over 1000m²
- Triggered by extension, initial provision or increased capacity of fixed building services
- Additional “trigger” including of increase in habitable/conditioned area
- Improvements drawn down from EPC recommendations
- Planned work can be considered as consequential

Transitional Arrangements

Changes to come into effect from 1 October 2010 except for:

- Work already (***physically***) commenced
- Where no notification and contract in place before 1 October 2010 (competent person schemes, Schedule 2B)
- Building notice, full plans, initial notice or plans certificate given to a local authority before 1 October 2010 and carried out in accordance with the plans or notice given, so long as work ***physically*** commenced by 1 October 2011

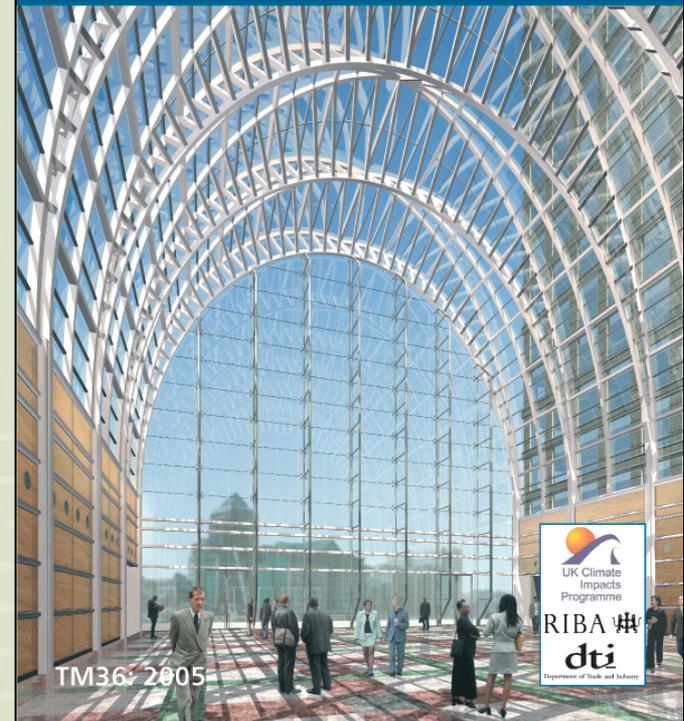
Identifying pressures for change & options for deregulation

- Andrew Stunell exercise calling for ideas about how the regulations can be improved, added to, or slimmed down and how we can deliver even better levels of compliance
- Analysing responses to this exercise together with those received from the Your Freedom, Cutting Red Tape websites
- Complementing this with workshops run by CLG and external partners
- Ministerial statement on future of building regulations expected at end of 2010 for consultation in late 2011, revised Part L in 2012 and introduction of changes in 2013
- BUT all predicated on the basis that we should only be using national regulation where it is considered the most cost-effective means of achieving policy aims. New regulations only considered on the basis of **one in one out**.

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

Climate change and the
indoor environment:
impacts and adaptation



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