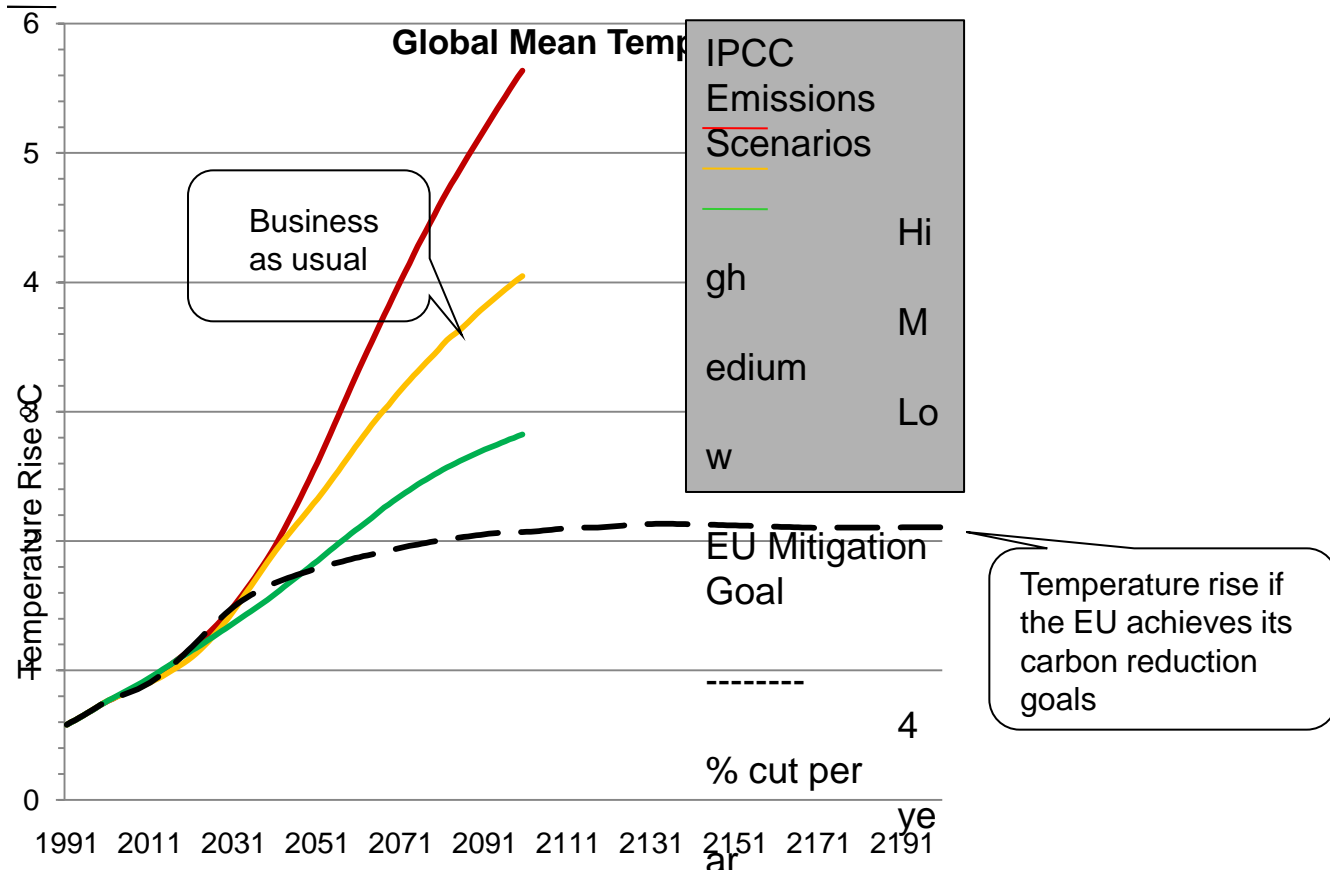


# Building Regulations Part L 2010

## SCHEME AGM 30 June 2010

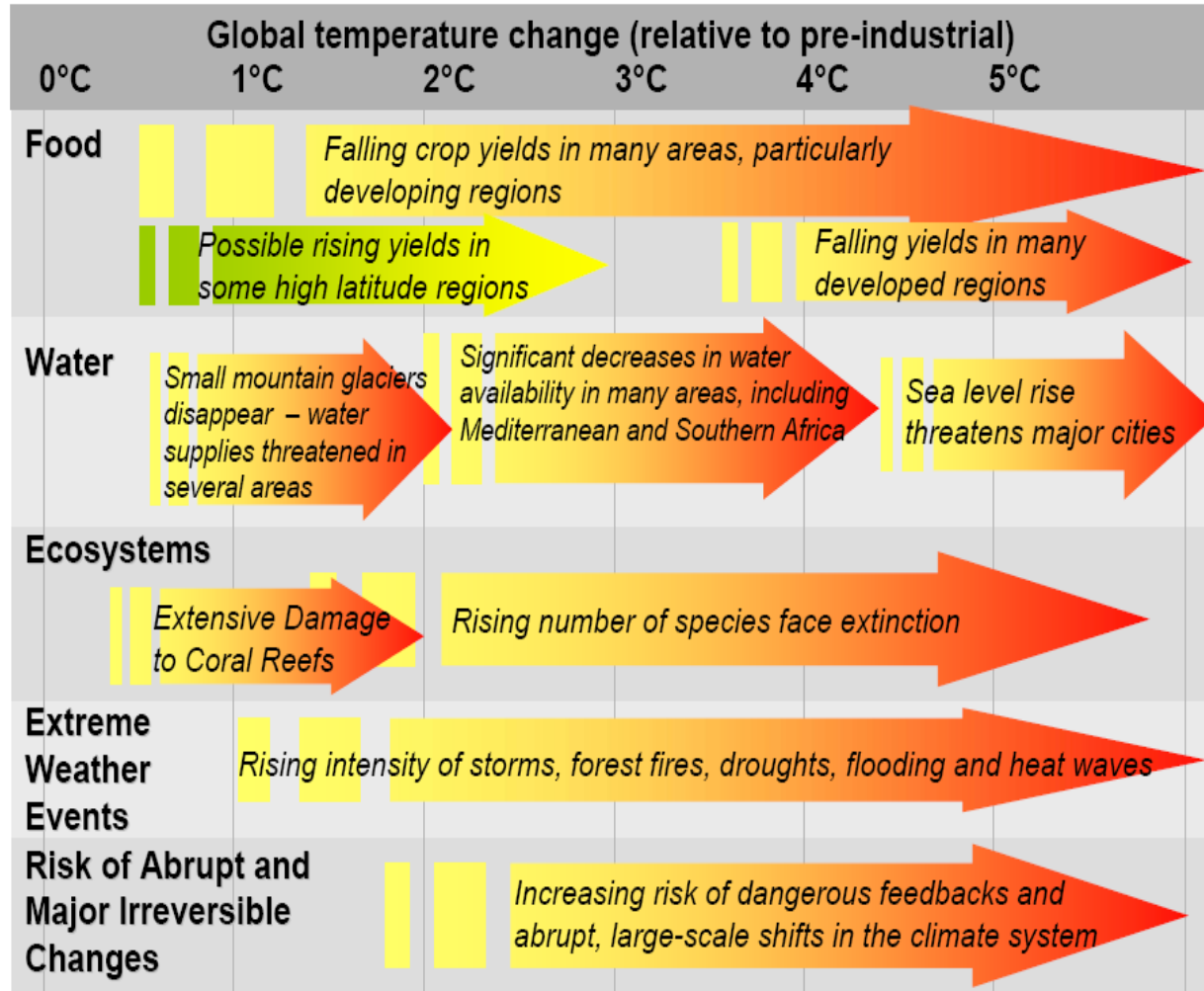
**Paul DeCort, Sustainable Buildings Division  
Communities and Local Government**

- Part L 2010
  - Policy drivers
  - Revised standards and guidance
    - New build
    - Existing buildings
- Other 2010 changes
- Summary and Programme



- The UN has set out various emission path scenarios and the impact of various temperature rise scenarios
- Even if carbon emission reduction targets are met, we are looking at least at a 2°C temperature rise

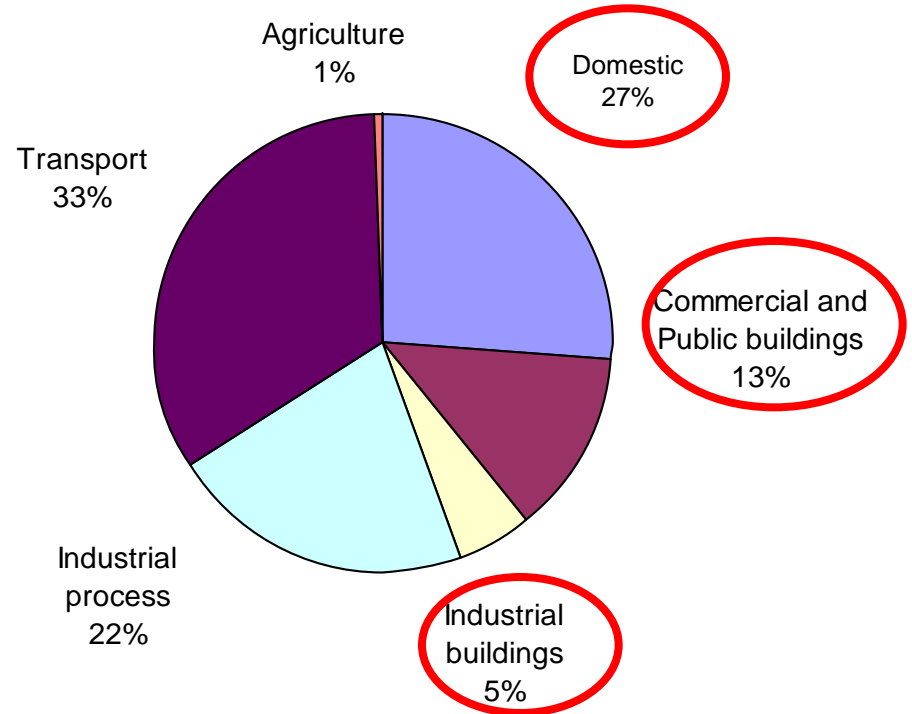
## Projected impacts of climate change



# Drivers for Change

- Climate Change Act: reduce emissions by 80% by 2050
- Buildings account for 45% of UK carbon emissions
- Also security of supply and fuel poverty issues
- Raising energy efficiency standards via Building Regulations is key
- Ensure health standards not compromised

In 2005, the UK emitted 550m tonnes of CO<sub>2</sub><sup>(1)</sup>



(1) Source: Energy White Paper, 2007

## New Build: Compliance Steps

Criterion 1: Meet whole building carbon dioxide target  
(BER/DER  $\leq$  TER)

Criterion 2: Limits on design flexibility (backstops)

Criterion 3: Limiting effects of solar gain

Criterion 4: Quality of construction & commissioning

Criterion 5: Providing information / O&M instructions

**No changes proposed**

# Criterion 1: CO<sub>2</sub> Calculations

However:-

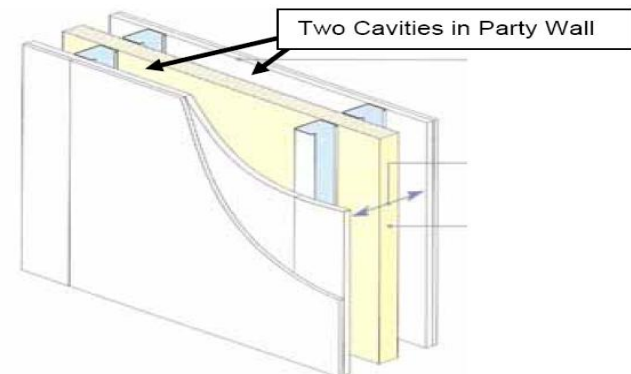
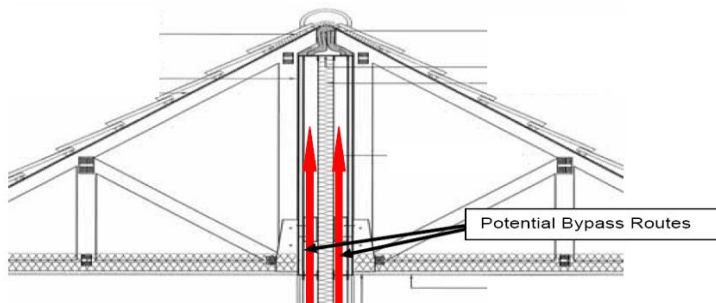
- New regulatory requirement for CO<sub>2</sub> emission rate calculations to be submitted before the start of building work along with a list of the specifications used in the calculations
- This is in addition to the CO<sub>2</sub> emission rate calculation required to be submitted after completion of the work

*This design stage calculation and list of specifications will assist Building Control in confirming what is being built aligns with the claimed performance.*

*The Approved Document sets out how compliance software input data could link to the list of specifications and highlights those features of the design that are critical to achieving compliance.*

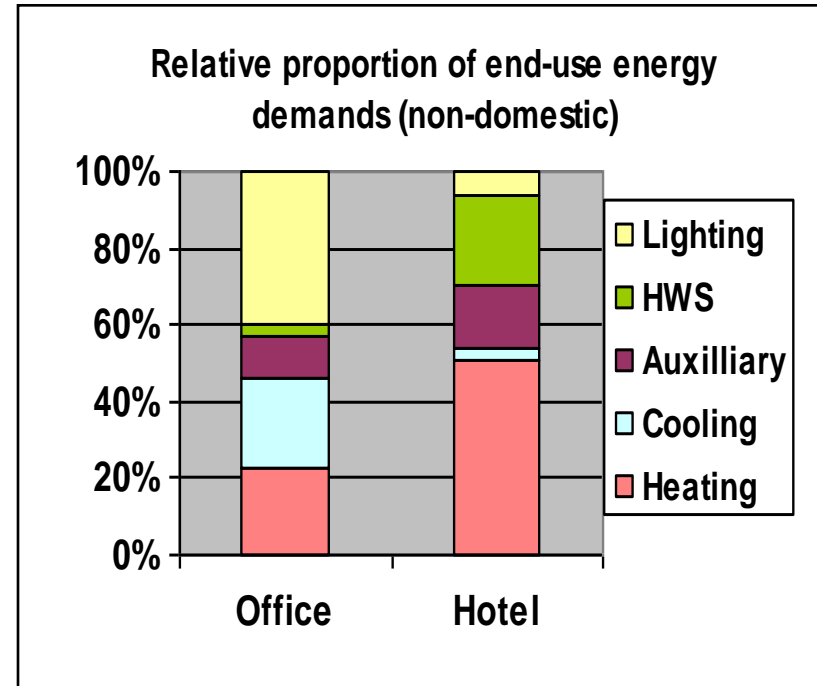
## Criterion 1: New Homes

- A “flat 25%” improvement for every new home calculated using SAP2009
- CO<sub>2</sub> target (TER) set by reference to a 2002 notional dwelling with additional improvement of 25% relative to 2006 standards
- Appeasement (fuel factor) for fuels having greater carbon intensity than mains gas and block averaging retained
- Secondary heating only counted as part of the dwelling emission rate (DER) when actually installed or provided for
- Credit allowed wherever low energy lamps actually installed in fixed lighting locations
- Notional dwelling now includes party wall heat loss of zero



# Criterion 1: New Non Domestic Buildings

- An “Aggregate 25%” improvement for new build stock rather than per building
- Takes into account the difficulties/opportunities of improving energy efficiency in different types of building based on relative cost effectiveness of making improvements to typical components
- Some buildings deliver more than 25%, some less – optimised to deliver national target of 25% when applied across build mix



# Projected Mix of Buildings

<b>Non-domestic building type</b>	<b>% of mix</b>	<b>CO2 reduction</b>
Shallow plan (heated only)	1	22%
Shallow plan (Air conditioned)	1	40%
Deep plan (Air conditioned)	40	26%
Warehouse	33	34%
Hotel	6	16%
School	4	27%
Retail	12	21%
Supermarket	2	26%

# Criterion 1: New Non Domestic Buildings

- 2010 notional building with improved building fabric and HVAC specifications and with no improvement factor
- Side-lit, roof-lit and no-lit classes of notional building determined by activity type assigned to zones in actual building
- Heating fuel and seasonal efficiency in notional building varies as a function of the fuel used in the actual building
- Management feature credits for aM&T and power factor correction retained
- Calculated using SBEM 2010 or approved Dynamic Simulation Models (DSMs)

# 2010 Notional Building

	“Roof-lit”	“Side-lit”
Roofs (u-value)	0.18	0.18
Walls (u-value)	0.26	0.26
Floors (u-value)	0.22	0.22
Windows, doors and rooflights (u-value)	1.8	1.8
Air permeability	5	5
Lighting (lm/W)*	55	55
Multiburner radiant system (thermal/radiant efficiency)	86%/65%	-
Central mechanical ventilation (SFP)	1.8	1.8
Fan coil units (SFP)	-	0.5
Gas boilers (seasonal efficiency)	90%	88%
Cooling (SEER)**	4.5	4.5
DX Cooling (SEER)	-	3.5

## Criterion 1: Calculation Tools

- **SAP2009** for new dwellings
- **SBEM2010** or approved DSMs for non-domestic buildings
- Improved calculation of auxiliary energy for HVAC and improved lighting procedures
- Rationalisation of building types linked to planning classes with simplified activity types below this
- Convergence of results from SBEM and DSMs
- Updated weather data
- New CO<sub>2</sub> emission factors

<b>Fuel:</b>	<b>2006 kgCO<sub>2</sub>/kWh</b>	<b>2010 kgCO<sub>2</sub>eq/kWh</b>
<b>Mains Gas</b>	<b>0.194</b>	<b>0.198</b>
<b>Heating Oil</b>	<b>0.265</b>	<b>0.274</b>
<b>Wood Pellets</b>	<b>0.025</b>	<b>0.028</b>
<b>Grid Electricity</b>	<b>0.422</b>	<b>0.517</b>
<b>Displaced Elec.</b>	<b>0.568</b>	<b>0.529</b>

## Criterion 2: Limits of Design Flexibility

- Criterion 2 sets minimum levels of energy efficiency for building fabric and services
- Intent is that CO<sub>2</sub> targets cannot be achieved through renewables alone
- Some strengthening of backstops
- Emphasis on quality of construction, thermal bridging and fixed building services
- However more stringent values will be required to meet higher 2010 CO<sub>2</sub> targets

## Criterion 2: Fabric Backstops

**Table 4: Limiting fabric parameters**

Roof	0.25 W/m <sup>2</sup> .K
Wall	0.35 W/m <sup>2</sup> .K
Floor	0.25 W/m <sup>2</sup> .K
Windows, roof windows, rooflights <sup>3</sup> , curtain walling & pedestrian doors <sup>1,2</sup>	2.2 W/m <sup>2</sup> .K
Vehicle access and similar large doors	1.5 W/m <sup>2</sup> .K
High usage entrance doors	3.5 W/m <sup>2</sup> .K
Roof ventilators (inc. smoke vents)	3.5 W/m <sup>2</sup> .K
Air permeability	10.0 m <sup>3</sup> /h.m <sup>2</sup> at 50 Pa

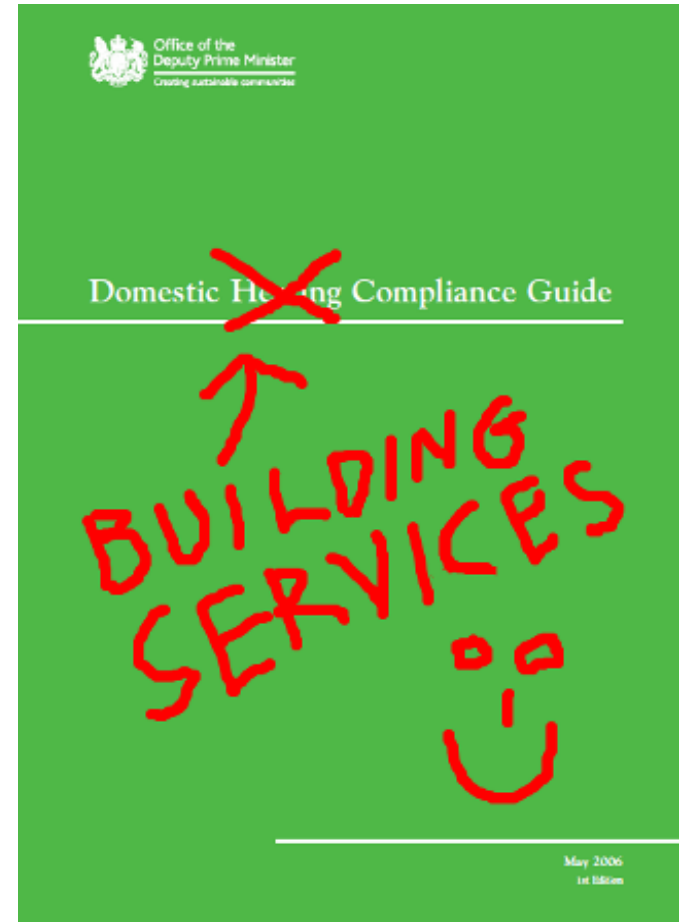
<sup>1</sup> Excluding display windows and similar glazing. There is no limit on design flexibility for these exclusions but their impact on CO<sub>2</sub> emissions must be taken into account in calculations.

<sup>2</sup> In buildings with high internal heat gains, a less demanding area weighted average U-value for the glazing may be an appropriate way of reducing overall CO<sub>2</sub> emissions and hence the BER. If this case can be made, then the average U-value for windows can be relaxed from the values given above. However values should be no worse than 2.7 W/m<sup>2</sup>.K.

<sup>3</sup> The relevant rooflight U-value for checking against these limits is that based on the developed area of the rooflight, not the area of the roof aperture.

# Building Services Compliance Guides

- Two domestic and non-domestic compliance guides set energy efficiency standards for building services
- Limit design flexibility for new build
- Standards raised compared with earlier editions of guides and updated in line with BS ENs
- Non-domestic guide has new sections on lighting and circulator pumps
- Includes guidance on installation and commissioning



# Non-Domestic Guide

## Main Changes

### **Biomass boiler system efficiencies**

- 65% (<20.5kW gravity fed)
- 75%(automatic pellet/woodchip)

### **Heat pumps**

- COP raised from 2.0 to 2.2
- Minimum seasonal performance factor

### **Air-distribution**

- Lower maximum specific fan power
- Greater range of system types
- Heat recovery requirement, with minimum recovery efficiencies for system

### **Chiller plant**

- Greater range of chiller types
- Minimum SEERs increased

### **Internal lighting – new and existing**

- Minimum efficacy 55 luminaire lumens per circuit-watt (with control factors)

### **Heating system circulators and water pumps**

- Europump Labelling Scheme A to G rating
- Variable speed as appropriate

## Criterion 3: Limits on Solar Gains

### Non-domestic

- New approach to limiting solar gains in non-domestic buildings.
- Limit on solar gain per unit area of façade, applies to both naturally ventilated and air conditioned spaces.
- Will require that good solar protection where highly glazed facades are proposed.



## Criterion 4: Building Performance (Linear Thermal Bridging)

	Quality calc	Build-ability	Checks made	Ψ-margin
ACD Scheme	✓	✓	<ul style="list-style-type: none"> <li>• <b>ψ-value calculated by “accredited expert” calculator</b></li> <li>• <b>Independent assessment of buildability &amp; robustness</b></li> </ul>	0%
Private	✓	×	<ul style="list-style-type: none"> <li>• <b>Accredited calculation</b></li> <li>• <b>No independent assessment of buildability</b></li> </ul>	+ 0.02 W/mk or 25%
None	×	×	<ul style="list-style-type: none"> <li>• <b>No accreditation</b></li> </ul>	+ 0.04 W/mk or 50%

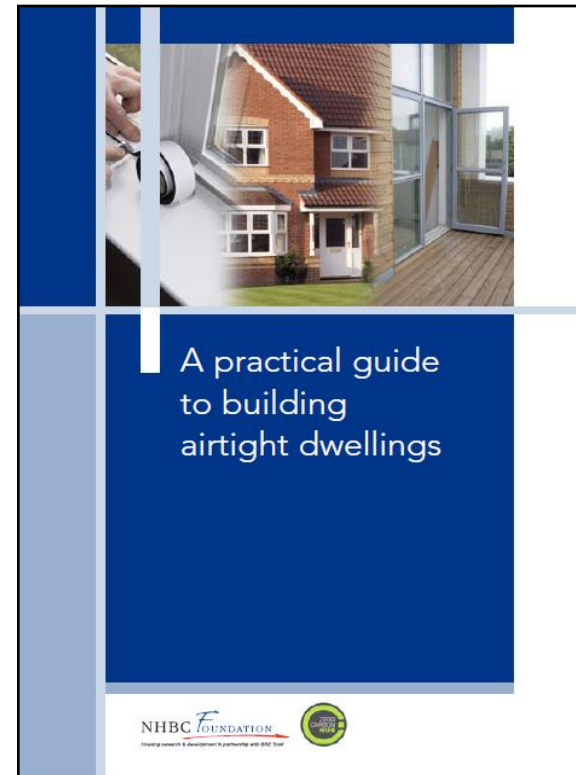
## Criterion 4: Building Performance (Airtightness testing)

Increase in sampling rate (~ doubled)  
for domestic developments

Change to 'Test method B' from  
ATTMA Guide - trickle vents  
temporarily sealed rather than just  
closed - better test of building  
envelope

Separate ATTMA Guides for domestic  
and non-domestic

Alternatives for small housing  
developments and very large  
buildings



# Criterion 5: Provision of Information

- Information on how to use and maintain the building efficiently
- Logbooks for non domestic buildings
- The data used to calculate the TER and the BER should be included
- Improvement recommendations to be provided with the on-construction EPC

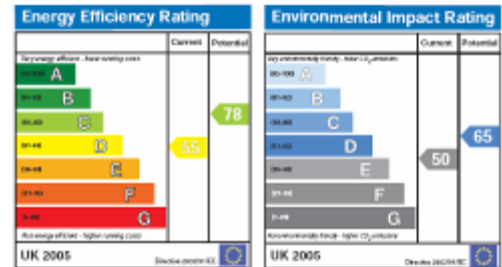
## Section H: Energy Performance Certificate Save money, improve comfort and help the environment

The following report is based on an inspection carried out for:

Address: 100 Any Street, Any Town, Anywhere, AB1 0DZ	Building type: Whole or part of building	Home Whole	Certificate number: Date issued: Name of Inspector:	XXXX XXXX XXXX
Assessment method: Date of inspection:		SAP XXXX		

### This home's performance ratings

This home has been inspected and its performance rated in terms of its energy efficiency and environmental impact. This is calculated using the UK Standard Assessment Procedure (SAP) for dwellings which gives you an energy efficiency rating based on fuel cost and an environmental impact rating based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be. The environmental impact rating is a measure of the home's impact on the environment. The higher the rating the less impact it has on the environment.

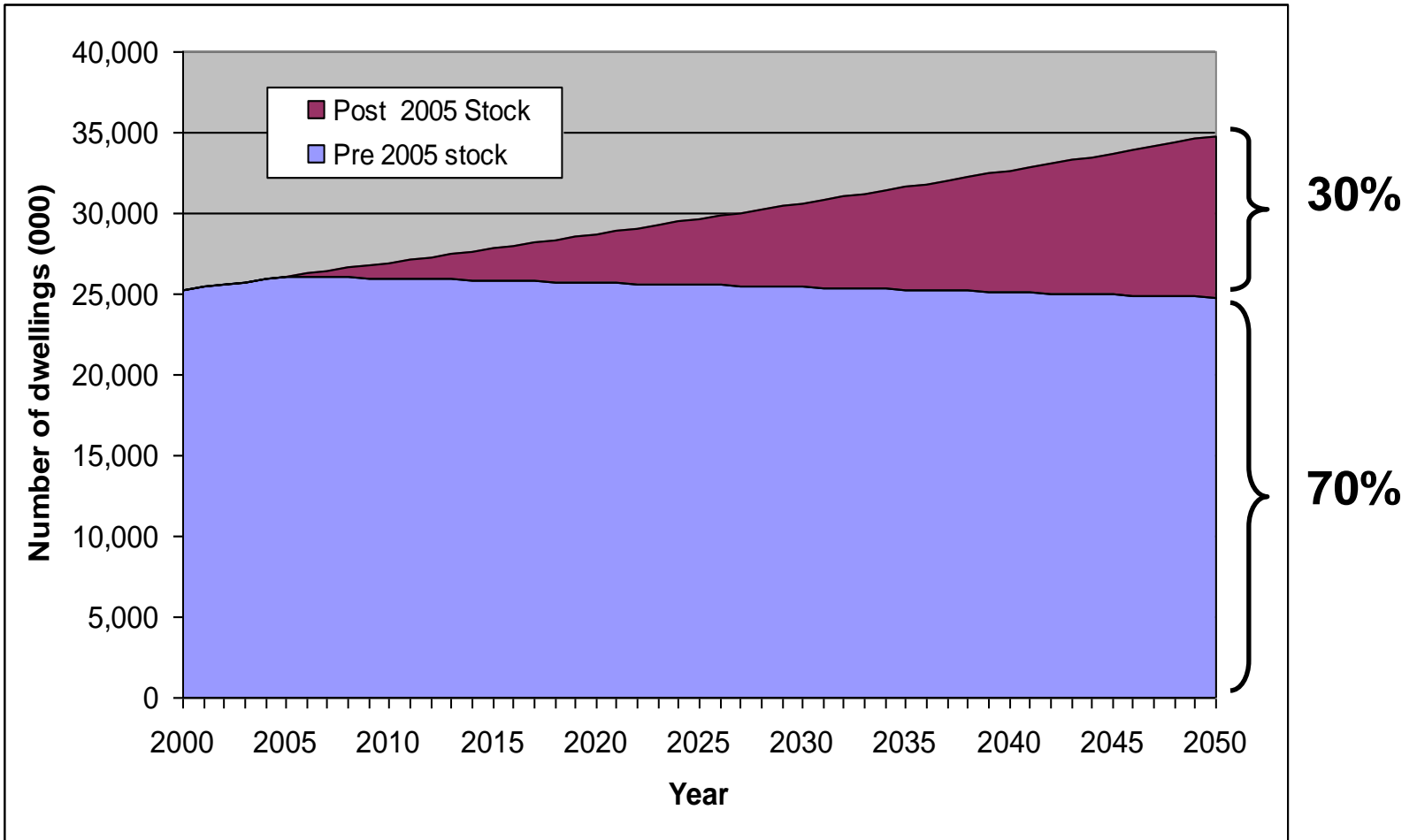
### Typical fuel costs and carbon dioxide (CO<sub>2</sub>) emissions of this home

This table provides you with an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs and carbon dioxide emissions are calculated based on a SAP assessment of the actual energy use that would be needed to deliver the defined level of comfort in this home, using standard occupancy assumptions, which are described on page 4. The energy use includes the energy used in producing and delivering the fuels to this home. The fuel costs only take into account the cost of fuel and not any associated taxes, maintenance or safety inspection costs. The costs have been provided for guidance only as it is unlikely they will match actual costs for any particular household.

	Current	Potential
Energy use	xxx kWh/m <sup>2</sup> per year	xxx kWh/m <sup>2</sup> per year
Carbon dioxide emissions	xxx tonnes per year	xxx tonnes per year
Lighting	£xxx per year	£xxx per year
Heating	£xxx per year	£xxx per year
Hot water	£xxx per year	£xxx per year

To see how this home's performance ratings can be improved please go to page 2

# Importance of Existing Stock



Source: Housing Statistics – ODPM 2004

## 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  $0.25 \text{ W/m}^2\text{K}$  as calculated according to BS EN ISO 13370
- Extensions continue to use elemental approach but can trade-off or use SAP/SBEM for greater flexibility
- Additional “trigger” for consequential improvements for buildings over  $1000\text{m}^2$  including of increase in habitable / conditioned area
- Regulation 9 amended to clarify when an extension is a conservatory or porch that is not exempt from the energy efficiency requirements and amended guidance is given
- More focused guidance for thermal elements.

# Renovation of thermal elements

Updated guidance to clarify renovation of a thermal element through the provision of a new layer or the replacement of an existing layer.

Renovation only applies where the area to be refurbished is greater than one of the following limits (smaller proportions being regarded as repairs):

- a) 50% of the surface of the individual element; or
- b) 25% of the total building envelope *{consistent with the EPBD}*.

When assessing the area proportion, the area of the element should be taken as that of the individual element, not all the elements of that type in the building.

## Part F 2010 Changes

- Part L changes encourage good airtightness so adequate purpose provided ventilation is needed to maintain healthy IAQ
- Typically over 80% of our time is spent indoors and we need the air that we breathe to be healthy - especially important for vulnerable groups
- To meet Part L standards, mechanical ventilation systems with heat recovery likely to become more common
- Research suggests ventilation systems failing to achieve design flow rates including underperformance of intermittent extract fans and door under-cuts typically less than 10mm
- Revised guidance for both natural and mechanical ventilation systems, with separate provisions for homes having high and low levels of air permeability (infiltration)
- New requirements and guidance for installation and commissioning of ventilation systems with provision of advice

## Part F 2010 Installation and commissioning requirements

- Where a mechanical ventilation system (intermittent or continuous) is installed, air flow rates should be measured on site and a notice of the results given to Building Control **(new dwellings only)**  
*New domestic ventilation compliance guide includes the approved air flow rate testing procedure as well as results sheet to be completed that forms the notice of results*
- Where a mechanical ventilation system is installed, and the air flow rate can be adjusted and tested, the system should be commissioned and a notice confirming commissioning has been carried out given to the Building Control **(all buildings)**  
*New domestic ventilation compliance guide includes the approved commissioning procedure for dwellings. (CIBSE Code M should be followed for non-domestic buildings)*

## Part F 2010 Installation and commissioning requirements

- The building owner should be given sufficient information about the ventilation system and its maintenance requirements so that the ventilation system can be operated to provide adequate air flow **(all buildings)**

*For new and existing dwellings, the new domestic ventilation compliance guide recommends the documents that should be given to the building owner at installation handover. This must include a completed inspection checklist, air flow measurement results and commissioning sheet. (For new and existing non-domestic buildings, a way of showing compliance would be to follow the guidance in ADL2a and ADL2b which references CIBSE TM31 Building log book toolkit).*

## Part J 2010 Changes

- New guidance for access for visual inspection of concealed flues to ensure that they can be properly inspected both when an appliance is first commissioned and subsequently serviced
- Guidance amended to increase the permanent ventilation openings for open flued appliances in airtight houses (with a design air permeability less than or equal to 5 m<sup>3</sup>/h/m<sup>2</sup>)
- New requirement on the provision of carbon monoxide alarms where solid fuel appliances are installed affects both new and existing dwellings
- Guidance for flue outlet clearances relative to adjacent pitched roofs clarified
- Guidance on the provision of hearths and wall clearances for solid fuel appliances have been made more flexible

# 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 so long as work commenced by 1 April 2011 (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 commenced by 1 October 2011

## **Part L – Conservation of fuel and power**

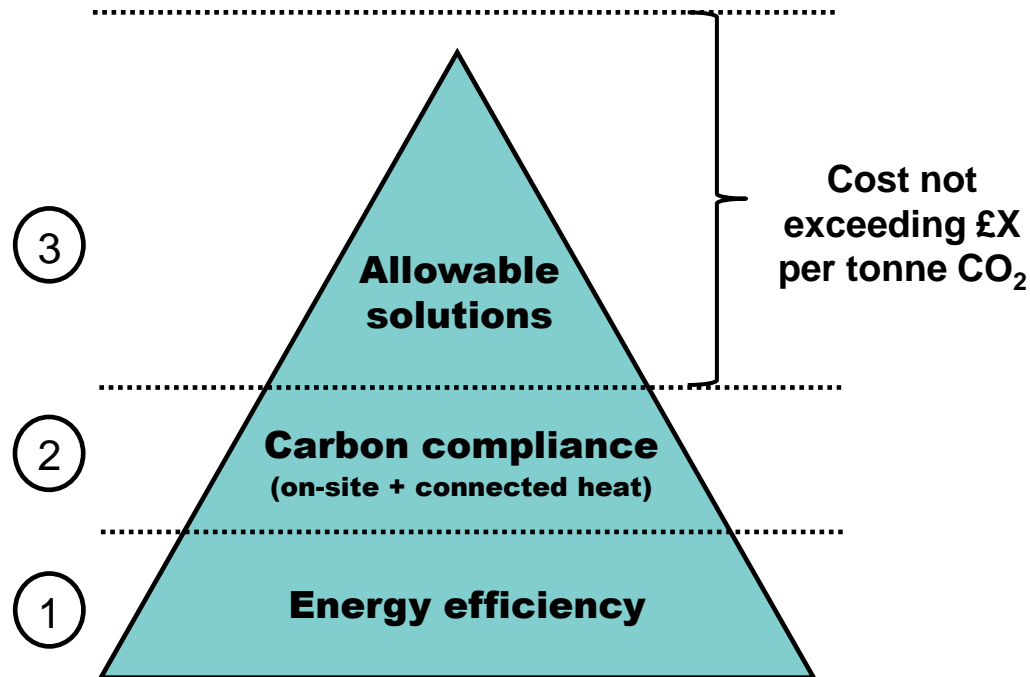
- Approved Document L1A – new dwellings
- Approved Document L1B – existing dwellings
- Approved Document L2A – new non-domestic
- Approved Document L2B – existing non-domestic
- Domestic Building Services Compliance Guide
- Non-Domestic Building Services Compliance Guide

## **Part F – Ventilation**

- Approved Document F
- Domestic Ventilation Compliance Guide

## **Part J – Combustion**

- Approved Document J



- Ambition for new non-domestic buildings to be zero carbon from 2019
- Recent consultation on for taking forwards zero carbon new non-domestic buildings

Subject to agreement with new ministers

## New Ministers



Eric Pickles MP



Grant Shapps MP



Greg Clarke MP



Baroness Hanham



Bob Neill MP



Andrew Stunnell MP

**Fire Service**

**Building Regulations**

- Delivers around 2 million tonnes of carbon a year by 2020
- An **improvement of 25% in the energy efficiency standards of every new home**
- An **aggregate improvement of 25% in the energy efficiency standards of all new non-domestic stock**
- Measures to **improve compliance**
- **Tightening of existing standards for some building services and elements**
- Changes to Part F to **ensure adequate ventilation provision** in more air-tight buildings and ***new requirements and guidance for installation and commissioning*** of ventilation systems
- Changes to Part J

