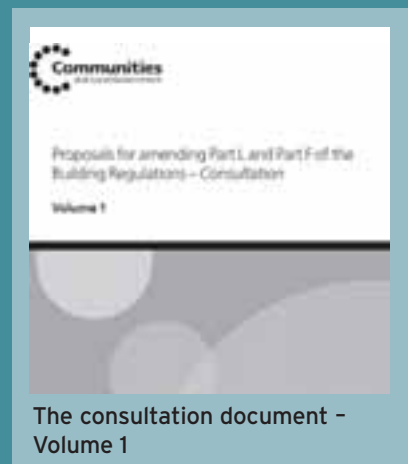


August 2009

Consultation on changes to Building Regulations Parts L and F

(Conservation of Fuel and Power/Mean of Ventilation) for England and Wales



The consultation document - Volume 1



In July 2007, the Government published **Building a Greener Future: Policy Statement** which confirmed its intention that new homes would ultimately be designed and constructed to 'zero carbon' standards. It said that this goal would be achieved in 3 steps - a 25% reduction in carbon dioxide emissions in 2010, followed by a 44% improvement in 2013, with the final step to zero carbon being taken in 2016.



The present Government consultation was published on 18 June 2009 and outlines proposals for changes to Part L of the Building Regulations for England and Wales aimed at achieving the first step of a 25% reduction. It also outlines complementary changes to Part F.

The consultation closes on 17 September 2009 and following analysis of the comments received the Approved Documents (ADs) that support Parts L and F will be finalised. It is expected that they will take effect from October 2010. The transitional provisions will be confirmed in due course.

The journey towards zero carbon will be highly challenging - arguably the house-building industry's biggest ever technical challenge - and the way in which homes are designed and built will have to change fundamentally. For this reason it is important that we all have a good understanding of the proposed changes at this stage, and that as many people as possible, particularly NHBC's Registered Builders, take the opportunity to respond to the consultation.

The consultation document is lengthy because it refers to all buildings - domestic and non-domestic, both new build and work in existing buildings, and also includes additional supporting information. It is around 800 pages in total.

The full consultation document, together with a response form, is available at:
<http://www.communities.gov.uk/publications/planningandbuilding/partlf2010consultation>

Consultation on changes to Building Regulations Parts L and F continued: Summary of key points for new house building



Reducing emissions

The basic approach of the current AD (AD L 2006) will remain and emissions will be modelled using SAP (Standard Assessment Procedure) - see notes on page 4. A 25% reduction in carbon dioxide (CO₂) emissions beyond AD L 2006 has to be achieved and this will require a package of improvements to the building fabric and services specification to be implemented. In many circumstances some renewable energy generating capacity will also need to be provided.

A key question asked in the consultation is whether the 25% should be applied rigidly for each and every building (the 'flat option'), or whether some flexibility should be allowed, provided that on average 25% is achieved across the range of new buildings (the 'aggregate option'). This flexibility would recognise that, for example, because flats are already inherently energy efficient, achieving a further 25% CO₂ saving is very hard. Conversely it is relatively straightforward for an improvement greater than 25% to be made for some detached homes. The measures required and their associated costs could therefore be disproportionate for certain types of building.

Fabric first

The consultation expresses a clear preference for the fabric of the building to be designed and built to high standards because energy efficiency measures, such as insulation, are 'locked in for the lifetime of the building'. In contrast, it is noted that providing large amounts of renewable energy that is then 'wasted' by an inefficient building fabric does not make sense. Fabric measures are encouraged by the use of 'longstop' U-values, which are retained at the levels of AD L 2006.

An end to the party wall bypass

The Stamford Brook research project demonstrated that a significant cause of heat loss from homes, not accounted for in SAP calculations, is the 'party wall bypass'. This is the heat escaping to the outside through the cavity of the party wall. The proposed AD recognises this mechanism and encourages sealing of the party wall around its edges and/or the use of full-fill insulation to limit the movement of air and associated heat loss.

Further information on the Stamford Brook research project, which was supported by NHBC, was published in NHBC Sustainability Extra 1, May 2008 available at: <http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/StandardsExtra/filedownload,33628,en.pdf>

Keep your cool

A growing concern is that well insulated homes - particularly those designed to benefit from passive solar gain, with larger glazed areas facing towards the south - will be liable to overheat, especially if average temperatures increase as a result of climate change. This could drive homeowners to install air conditioning, which would greatly increase household CO₂ emissions. To address this issue and reduce the risk of overheating SAP 2009 includes a more rigorous procedure to check whether solar gains are excessive, particularly during the summer months.

Build tight

One of the main causes of heat loss from homes is air leakage and the 2006 changes to AD L introduced a requirement for a sample of new homes on each development to be pressure tested. The latest proposals build on that requirement by asking for a larger sample to be subjected to a pressure test. Further encouragement for testing of an even larger sample is proposed by requiring that, for those homes not actually tested, a lower

NHBC's initial observations

- 1** The proposals are clearly the result of much very detailed work and we commend colleagues at the Department of Communities and Local Government and their contractors for their careful consideration of a very complex subject.
- 2** The timescale for the industry's progression towards building zero carbon homes has been known for two years. However, we remain of the view that the transition will be extremely challenging for house builders, their advisers and the supply chain. This is exacerbated by the serious economic downturn currently being suffered.
- 3** NHBC is committed to reducing CO₂ emissions from new homes. However, we believe that significant technical risk will be associated with the changes being proposed and we will need to work closely with industry and government to minimise this risk.
- 4** The stepped transition towards zero carbon is welcomed, however, the predetermined pace of change does not allow adequate time for proper learning from previous steps. We welcome the active role that the Zero Carbon Hub will play in monitoring progress. For further information on the Zero Carbon Hub please see: <http://www.zerocarbonhub.org/>
- 5** There is a lack of data from post-occupancy monitoring of energy efficient homes and this is a fundamental issue that needs to be addressed as a matter of urgency. The research done at Stamford Brook is a perfect example of the essential type of data and evidence needed.
- 6** We favour the 'aggregate option' on the basis that it does not penalise built forms that are inherently energy efficient. Perverse outcomes and disproportionate costs that could be encouraged by the 'flat option' need to be avoided.
- 7** NHBC supports the Government's preference for fabric improvements that will last the life of the home. We agree that these should be valued over and above other measures which may have a short life or deliver less predictable benefits.
- 8** Having been closely involved since the inception of the Part E Robust Details scheme, we share enthusiasm for the results it has achieved and believe that there is considerable merit in advancing a similar solution for Part L.
- 9** Following on from independent BRE research recently published by the NHBC Foundation, NHBC has concerns about the indoor air quality in homes built with higher standards of airtightness (see page 7). This is one particular aspect where we feel thorough post-occupancy monitoring needs to be undertaken as a matter of priority - it is clearly important that a good indoor environment is capable of being maintained in all homes.
- 10** We welcome the recognition of the need for widespread training and dissemination, which will be critical for achieving improved compliance with increasingly challenging standards.

Consultation on changes to Building Regulations Parts L and F continued:

level of airtightness needs to be assumed, i.e. the home is assumed to be less airtight [$2\text{m}^3/(\text{h.m}^2)$ worse than the average result being achieved on site] and additional compensating measures will need to be provided.

The NHBC Foundation has recently published 'A practical guide to building airtight dwellings' - see page 7.

Thermal bridging

Additional emphasis is placed on thermal bridging and, in future, it will be essential for all junction details (e.g. wall to floor; wall to window) to be designed carefully to minimise heat loss. Encouraged by the impressive performance of the Robust Details scheme for Part E (Sound), the Government is keen for a similar 'Accredited Construction Details Scheme' (or schemes) to be developed to manage the design and on-site implementation of junction details, specifically designed to maintain the continuity of both the insulation layer and the air barrier. The use of Accredited Construction Details also reduces the amount of airtightness testing required.

Lighting the way

A requirement for 75% of fixed lighting to be fitted with low energy bulbs is proposed, although dedicated bulbs and fittings will no longer be necessary. This reflects the fact that ordinary incandescent lights are being phased out and will cease to be available in future.

Getting it right on site - improving compliance

There has been concern that some homes are constructed in such a way that their intended energy performance is not fully realised and the Government wishes to address this. In addition to the proposal for 'Accredited Construction Details Scheme(s)' referred to above, it is also proposed that a 'design stage energy performance calculation' should be submitted to the Building Control Body (BCB) with additional supporting information before work begins on site. This would identify clearly the particular features incorporated in the design which allow the home to 'pass' AD L. The intention is that the BCB will be able to do a more thorough job of inspecting for compliance if these features are clearly identified from the outset.

Ventilate right

Whilst higher standards of airtightness are being sought for the construction, it is essential that adequate ventilation is provided to ensure reasonable standards of indoor air quality can be maintained. The current ventilation requirements of AD F 2006 are based on construction that achieves an airtightness standard of 3 to $4\text{m}^3/(\text{h.m}^2)$, but it is now realised that a proportion

of homes designed to reach this level will turn out to be more airtight than $3\text{m}^3/(\text{h.m}^2)$. Indeed, since the introduction of the requirement for airtightness testing, NHBC has observed a marked improvement in test performance and it is inevitable that some homes will achieve standards higher than was intended.

There is a concern that very airtight homes could be inadequately ventilated. For this reason AD F 2010 sets a threshold of $5\text{m}^3/(\text{h.m}^2)$ and homes designed to achieve a higher standard of airtightness than this require additional ventilation provision. It is expected that homes built to higher levels of airtightness would normally be provided with mechanical ventilation with heat recovery.

The consultation document refers to research that demonstrates under-performance of mechanical extract ventilation systems due to poor installation and commissioning and recognises the need for practice to be improved in these areas. It also acknowledges the need for these systems to operate quietly - otherwise there is a risk that they will be turned off due to noise nuisance. Guidance and performance standards are included in AD F 2010 Appendix E.

As for AD L 2010, there is a requirement for user information to be provided in order to encourage correct operation and maintenance of the home and its heating and ventilation systems so that the expected performance is delivered in practice.

Notes

1. The SAP is currently under review and this will have an effect on all assessments. Further information is available in the consultation document (Volume 2, Chapter 5) and at www.bre.co.uk/sap2009. A free software tool called cSAP, based on SAP2009, which allows consultees to investigate the implications of proposed changes to the Regulations, to AD L and to SAP is available at: <http://www.2010ncm.bre.co.uk/>
2. The 25% reduction of AD L 2010 is not same as the 25% reduction required for Level 3 of the Code for Sustainable Homes. It is likely that the wording of the Code will be amended prior to implementation of AD L 2010 in order that the two documents align.

Building (Scotland) Regulations 2004

A review of standards and guidance in the Technical Handbooks on Section 6: Energy

The 2007 report 'A Low Carbon Building Standards Strategy For Scotland' (the 'Sullivan Report') made a variety of recommendations on improving the environmental performance of buildings. In response to that report the Scottish Government has now put forward proposals aimed at reducing aggregate CO₂ emissions from new buildings by 30% beyond current standards. It is expected that the new revised standards and guidance would be introduced from October 2010.

In addition to the overall requirement to improve performance, key proposals relevant for new housing include:

- presumption that 4.4m² solar panels will be provided
- tighter fabric 'backstop' maximum U-values
- a requirement for the heat loss through party walls to be controlled by sealing and/or fully fill the cavity
- increased attention to be paid to thermal bridging, with revised Accredited Construction Details and guidance
- improved requirements for uncontrolled air infiltration
- the introduction of air-tightness testing to be carried out on a sample of dwellings

Complementary minor changes to Section 3: Environment; Ventilation Guidance are also proposed and one of the key changes is that for homes designed to achieve airtightness better than 5m³/(h.m²), additional (mechanical) ventilation measures are needed.

The proposals were published on 30 June and the consultation closes on 2 October 2009. The consultation is available at <http://www.sbsa.gov.uk/latestupdates/consul.htm>



The 'Sullivan Report'



Scottish Government is proposing to reduce CO₂ emissions from new buildings by 30%

Code for Sustainable Homes

Management of Surface Water Runoff from developments (Sur 1)

NHBC's Code Assessor team is finding that the mandatory requirements for Sur 1 are causing some confusion amongst builders. The aim of Sur 1 is:

'To design housing developments which avoid, reduce and delay the discharge of rainfall to public sewers and watercourses. This will protect watercourses and reduce the risk of localised flooding, pollution and other environmental damage'.

This issue was updated in April 2008 to align the Code criteria with the government's planning policy statement PPS25: 'Development and Flood Risk' and with the CIRIA 'Interim Code of Practice for Sustainable Drainage Systems (SUDS)'.

The mandatory criteria can be summarised as requiring both of the following:

A Peak rate of runoff

the peak rate of runoff should be no greater for the developed site than it was for the pre-developed site, factoring in increases due to climate change of up to 30% over the life of the development; and

B Volume of runoff

if the new development will increase the volume of runoff - e.g. where the overall impermeable area increases - the additional volume has to be reduced to zero, by using infiltration methods such as a soakaway, or **by re-use in the dwelling through a rainwater harvesting system**. If there is any residual additional volume after using a soakaway and/or rainwater harvesting, this must be discharged at a low rate as per the criteria hierarchy set out in the Code Technical Guide.



A waterlogged site

BRE, which manages the Code on behalf of Communities and Local Government, has confirmed that where ground conditions do not allow infiltration, **the provision of rainwater harvesting to reduce the additional volume as far as possible must be considered**. They advise that 'it is the intention of the Code that cost and maintenance burdens are not grounds for failure to meet the mandatory requirements'.

To meet these standards it is necessary to consider design options at the masterplanning stage as the requirement will have an effect on site layout, development densities and built form as well as site infrastructure requests.

The criteria aim to encourage new developments to avoid runoff as far as possible, then to reduce runoff, and finally delay runoff, to ensure that any new development has minimal or no negative impact on the potential for local or 'downstream' flooding.

Since Sur 1 is a mandatory requirement the failure to address this issue will lead to a Code Level of zero being obtained and so it is clearly essential that the issue is addressed from the outset.

Further guidance on rainwater harvesting is given on page 3 of Standards Extra 45.

NHBC Foundation

Since its inception in January 2006, the NHBC Foundation has published 18 reports on a wide variety of topics. All are available at the Foundation's re-designed website at: www.NHBCFoundation.org



The Code for Sustainable Homes simply explained NF15

Launched in December 2006, the Code for Sustainable Homes called for a step change in the way new homes are designed and constructed, and introduced a 1 to 6 star rating system to communicate their overall sustainability performance. In May 2008, a

mandatory requirement was introduced for all new-build homes in England to be rated against the Code and be issued with a certificate.

Many housing developers, particularly larger builders and those developing affordable homes, are becoming increasingly familiar with the Code and are quickly developing their expertise. Others have not yet built homes to comply with the Code and for them the prospect of getting to grips with the Code Technical Guide may be somewhat daunting (the current version is around 300 pages long).

Starting at page 1 of the Code Technical Guide and working your way through to the end may not prove the easiest or most effective way to get to understand the issues. The Code Simply Explained proposes an alternative approach and allows readers to benefit from the knowledge of others who are already further up the learning curve.



Zero Carbon Compendium - who's doing what in housing worldwide NF17

The Zero Carbon Compendium, produced in association with the Zero Carbon Hub and PRP, is a study of energy and sustainability standards around the world, which allows the UK's plans for zero-carbon housing to be considered from an international perspective. It considers a total of 15 countries.

Each country has been assessed against a framework of questions and presented in a standard format for easy comparison. 15 case studies provide information on the geographic, climatic and statistical indicators for each country as well as a brief review of each country's approach to low-and zero-energy housing. Each case study also includes an overview of policy and incentives to achieve environmental targets, mandatory requirements in terms of building energy and design, and an exemplar project that features good practice, innovation and the potential for deployment on a medium-to-large scale.

The report makes interesting reading and presents a variety of facts contrasting the approaches taken and the progress being made around the world. One of the key findings is that our use of CO₂ instead of kilowatt-hours as a metric for measuring energy performance of buildings sets the UK apart from the rest. Another is that our proposed definition of zero carbon, which includes energy consumed by domestic electrical appliances, is unique.



A practical guide to building airtight dwellings NF16

Changes to building regulations have now made airtightness an issue which cannot be ignored and as we get ever-closer to the zero carbon homes of the future excellent standards will have to be achieved in all new homes.

Feedback from airtightness testing across the industry is encouraging and demonstrates that considerable improvement has already been made. Key among the lessons already learned by many builders is that airtightness has to be given close attention from the early stages of the design and throughout the construction phase. It is not something that can be sorted out easily when the nearly completed home fails an air pressure test.

This guide, which has been jointly produced by the NHBC Foundation and the Zero Carbon Hub, brings together the experiences of those who have already got to grips with airtightness for the benefit of designers and builders who have not. It identifies the common air leakage paths in typical constructions and provides practical advice on how these can be addressed. It stresses the importance of designing in an air barrier and ensuring that its integrity is maintained throughout the construction phase.



Indoor air quality in highly energy efficient homes - a review of NF18

This review assesses the current state of knowledge on indoor air quality in energy efficient, airtight houses in the UK and elsewhere in the world. It summarises the characteristics of homes built to higher Levels of the Code for Sustainable

Homes, and discusses the relationship between indoor air quality and occupant wellbeing. Research in the UK, Europe and the rest of the world into indoor air quality and other factors which may impact on occupant wellbeing is reviewed.

Experience of building airtight homes in countries in very cold climates, such as Canada, central Europe, parts of the USA and Scandinavia, provides insights into construction practices that may be increasingly adopted in the UK as we get closer to zero carbon. The report highlights the need for further research in this area to ensure that the indoor air quality of the homes of the future is satisfactory.

Government publishes 'Low Carbon Transition Plan'

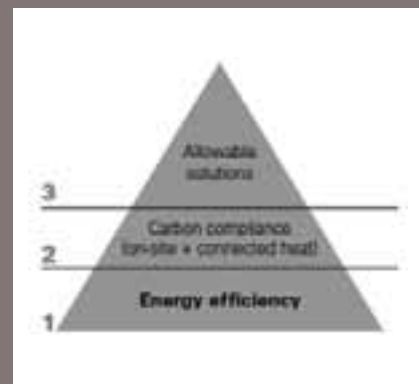
On 16 July 2009 John Healey, Minister of State for Housing and Planning, announced publication of the Government's 'Low Carbon Transition Plan'.

He said, "To respond to the challenge of climate change, we need to become a low-carbon country, achieving an 80 per cent reduction in greenhouse gas emissions by 2050. We must also meet the challenge to build more homes, so that everyone has a decent, secure and affordable home."

The announcement was a significant development in the industry's journey towards zero carbon as the definition of zero carbon home was confirmed as 'one whose net carbon dioxide emissions, taking account of emissions associated with all energy use in the home, is equal to zero or negative across the year'. It was also made clear that the Government's definition of energy use will cover both energy uses currently regulated by the Building Regulations and other energy used in the home (including all appliance use).



John Healey, MP



Zero carbon hierarchy

The Government has yet to determine the extent of the contribution that energy efficiency (including fabric U-values, airtightness, etc.) will make to achieving zero carbon and a specialist steering group is being set up to provide recommendations to the Minister. Led by the Zero Carbon Hub, it will report later this year. Implemented through the 2016 Approved Document L, the standards for energy efficiency will apply to all new homes in England and Wales, and so it is essential that they can be practically applied to all types of home.

The Minister also confirmed that the carbon compliance standard will be set at 70%. This means that 70% of regulated energy use will have to be mitigated on site through the use of technologies such as microgeneration or off site through heat or combined heat and power networks.

Any carbon not mitigated on site will be dealt with through a range of 'allowable solutions', which will cover carbon emitted from the home for 30 years after build. Although there is further work to be done, these are likely to include:

- further carbon reductions on site beyond the regulatory standard
- energy efficient appliances meeting a high standard which are installed as fittings within the home
- advanced forms of building control system which reduce the level of energy use in the home
- exports of low carbon or renewable heat from the development to other developments
- investments in low and zero-carbon community heat infrastructure

For full details of the announcement, see:

<http://www.communities.gov.uk/statements/corporate/ecozerohomes>

For more information on the Zero Carbon Hub, see <http://www.zerocarbonhub.org>

