

Part L 2013 Review – WG1: Domestic Working Group

Report from WG1 Domestic Part L

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Context

1. This report is from the Industry Working Group set up as part of the Part L 2013 review process and records the views of the industry as represented in the group. It was not intended that the group had to come to a consensus on all or any points. More the aim was to ensure that the diversity of views was accurately represented, thus allowing BRAC, DCLG officials and Ministers to make better informed policy decisions. Four meetings took place in May (2), June and July.
2. The policy context for new homes includes the deregulatory agenda (one in, one out and the pledge not to increase the overall regulatory burden on house builders over the current comprehensive spending review period), localism, and the growth agenda of which increasing housing provision is a part. The context also includes pledges for this to be the greenest government ever and the legally binding carbon targets within the Climate Change Act.
3. Achieving success in work on the viability tool for developments at plan level (house builders and local government led) is seen by the house builders as crucial. This would allow the balancing of many of the competing issues being driven by the complex policy context.
4. Because government has already committed to zero carbon new homes from 2016, it is crucial that government fully understands that any changes to Part L1 2013 are a step in the move to zero carbon from 2016 and not some isolated change. It is imperative that any changes in 2013 are designed to achieve the lowest net cost for 2013 and 2016 in total, rather than looking at the two changes in isolation and possibly ending up with higher costs overall. In terms of technical solutions for zero carbon homes, the Zero Carbon Hub has carried out extensive modelling to establish some ways in which house builders could meet the requirements. In addition a number of trade bodies have worked on further modelling for their particular sets of products including masonry and timber frame. (References to follow)
5. Establishing what the industry is actually using now for Part L 2010 is important but has been difficult; as yet very few homes are being built to this standard but just fewer than 25,000 homes have been built to Code Level 3 or above. Some data has been collected and this has

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allowed the group to broadly consider the scale of the change in technical specifications that would be needed to meet various possible options for Part L 2013.

Summary

6. At this stage there is not a consensus on the best options for the standards in Part L 2013. However there are some areas in new homes where a majority view does exist. These are:
 - The need to improve the fabric first before adding renewables
 - The aggregate approach rather than flat approach for setting the level of improvement over Part L 2010
 - Absolute targets are favoured rather than percentage improvements although this is not an overwhelming majority
 - Everyone except electric heating, heat pump manufacturers and timber frame believe fuel factors should be removed, although some would do this via a gradual phase-out.
 - Logbooks are supported but there is scepticism on whether the benefits would be realised in reality
 - Generally there is a view that there is a performance gap but at this stage the need is to gather more evidence and improve practice. There is no support for introducing more compliance on-site testing.
7. The Passivhaus Trust/AECB has proposed that a new dwelling certified as meeting the Passivhaus requirements should be a 'deemed to satisfy' option for Part L1A 2013. There does not appear to be any opposition to this in the Working Group given that this would be a voluntary option.
8. Views on existing homes are more complex and varied and other than on consequential improvements, it is hard to see many areas of agreement.
9. Views on SAP are generally that improvements need to be made for 2013. Each sector had their particular areas of concern, and views gathered have been passed to DCLG and the SAP contractor. These views are in addition to those detailed in the substantive review carried out by the Zero Carbon Hub and published as Carbon Compliance for Tomorrow's New Homes (July 2010).

Where are we now (2010)

10. In order to establish the options for changes in 2013 (which include no change), it is important to know what technical solutions are being used to meet Part L 2010. However, due to transitional arrangements in Part L 2010 there are very few Part L 2010 homes to look at. Around 25,000 Code Level 3 and above homes have been built but care has to be taken when looking at these because the Code for Sustainable Homes is not the same as Building Regulations. Credits for installing renewables under the Code and Merton Rule type policies may influence designers to specify less onerous fabric standards for instance.

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11. The DCLG report for Code homes for 2011 Q1 gives the following certification numbers:

	Design stage	Post completion
Level 3	49,954	22,592
Level 4	6,732	1,873
Level 5	399	101
Level 6	292	31

12. In general, the Working Group has taken the participant's expectations of what will be the typical Part L 2010 specification and used these in the 2010 Baseline modelling work. More details on the individual views can be found in the members' feedback forms. Below is a summary:

Walls:	A grouping around 0.2-0.26 with outliers down to 0.16 and up to 0.3
Roofs:	Larger builders down to 0.1 with most others below 0.13 but few up to 0.2
Floors:	Large range from 0.12 to 0.26. Beam and block tending to 0.14
Glazing:	Almost all double-glazed, coated, warm edge and argon filled. Range of g-values
Air tightness:	All in 5 to 8 range bar one outlier at 10
y-values:	All in 0.03 to 0.08 range except two outliers at 0.15

What we will need in 2016

13. The Zero Carbon Hub has carried out extensive modelling work to establish the typical technical solutions needed to meet zero carbon (see <http://www.zerocarbonhub.org/definition.aspx?page=8> for details). It is clear that a very well performing fabric will be a key starting point, followed by the inclusion of low and zero carbon technologies.

14. The Fabric Energy Efficiency Standard (FEES) was proposed by a Zero Carbon Hub Task Group in November 2009, and has subsequently been adopted within the voluntary Code for Sustainable Homes. The metric is kWh/m².yr space heating and cooling demand. The 2016 levels were recommended to be 39kWh/m².yr for apartments and mid terrace properties, and 46kWh/m².yr for end terrace, semi-detached and detached properties. An example FEES 2016 compliant specification for an end terrace house is as follows:

Walls:	0.18 W/m ² K (Party wall @ zero)
Roofs:	0.13 W/m ² K
Floors:	0.13 W/m ² K
Glazing:	1.4 W/m ² K
Air tightness:	5 m ³ /hr.m ²
y-values:	Use of ECDs

15. The Carbon Compliance levels for zero carbon homes were proposed by a Zero Carbon Hub Task Group in February 2011 to be as-built absolute limits (using 2016 CO₂ emission factors) of:

- 10 kgCO_{2(eq)}/m².yr for detached properties

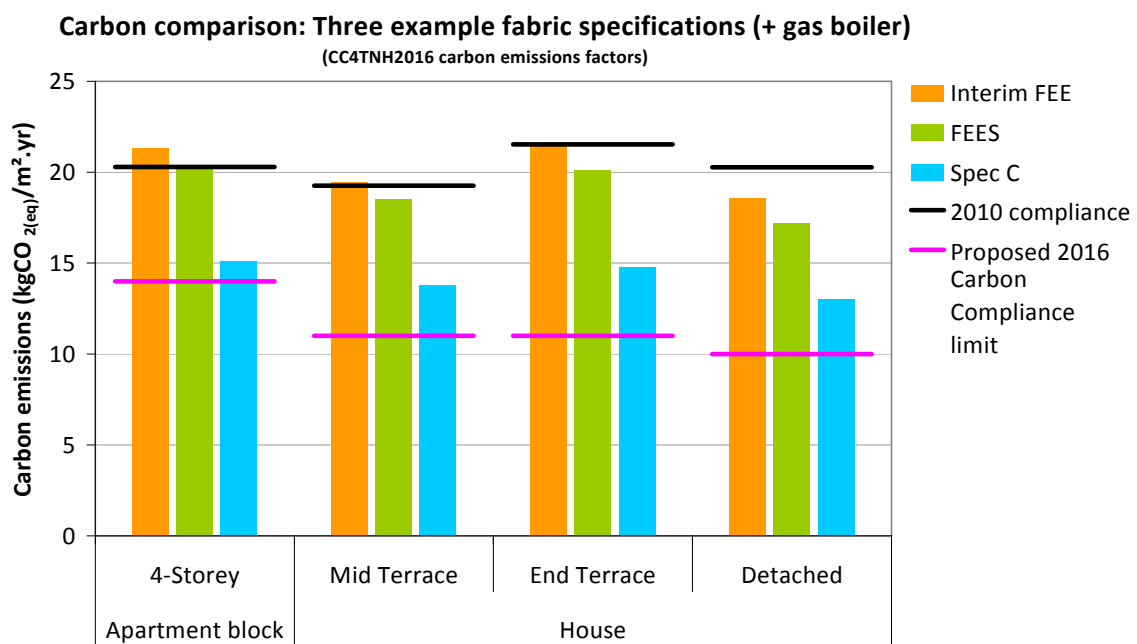
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- 11 kgCO_{2(eq)}/m².yr for attached properties
- 14 kgCO_{2(eq)}/m².yr for apartment blocks

2013 as a step to 2016

16. Unlike previous changes to Part L, there is a longer-term context for the 2013 change in that government has already set out the performance for Part L 2016 i.e. zero carbon with a Fabric Energy Efficiency Standard, a Carbon Compliance level and Allowable Solutions. Whilst much of this remain to be finalised (and formally consulted on and implemented) the possible technical solutions necessary for the homes in terms of fabric and onsite services are beginning to become clearer through Code homes and modelling. The Zero Carbon Hub and the various working groups have done much work in this area. In addition other groups including supplier trade associations have been modelling various solutions to see how their products would fit into a zero carbon home. Many of these organisations have publications showing that they can meet the challenge although some have expressed caution in the Working Group over the cost effectiveness of some solutions. (References to follow)
17. The Working Group is of the view that any changes to Part L 2013 must therefore be set in such a way as to make the transition to zero carbon as cost effective as possible. The nightmare scenario for all parties would be Part L 2013 driving technical and commercial solutions down a path that does not make the step to zero carbon from 2016 easier, in other words a technical or commercial cul de sac.
18. The house builder representative bodies (HBF, HBA and FMB) believe that there should be no change at all to the Part L requirements in 2013.
19. Amongst suppliers and other parties, there is a more nuanced debate about whether it is better to set performance requirements for Part L 2013 that mean some changes to both fabric (an interim FEES) and services this time and again in 2016, or whether it is better to set the 2016 fabric standards (FEES) for 2013 and not change the services until 2016. Whilst all parties agree that a policy that pushes fabric improvements first rather than renewables first is right, there is not agreement about how far these fabric improvements should go. It also has to be pointed out that setting the 2016 FEES standard as Part L 2013 with no other changes would typically result in carbon savings of around 4-15% over Part L 2010 for houses, and 0% for apartments (at some cost):

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20. Supporters of the full FEES in 2013 argue that it will future proof the 2013-2016 cohort of homes, the industry only has to focus on one area of improvement at a time, that fabric is more difficult to get right and so needs to be started earlier. In addition the services side of the industry has argued that with the implementation of the Energy Using Products Directive from 2012 onwards it needs stability in the UK regulations at this time.
21. Supporters of the interim FEES approach (changes to both fabric and services in both 2013 and 2016) tend to focus on better cost-effectiveness of their approach, the state of the housing market and the need to minimise extra costs for house-builders in 2013.
22. Whichever approach is taken (no change, interim FEES or full FEES in 2013) it leads to the conclusion that the Impact Assessment should look at the costs and benefits for both the 2010/2013 change and the 2013/2016 change, and seek to get the best overall solution, whilst being aware of the impact at each change. It is also worth noting that due to transitional arrangements there is a lag of at least two to three years from any change in Part L to significant numbers of homes being built to the new standard. Recent extensions of planning consents from 3 to 5 years will possibly increase this lag. Concerns about 2013 costs for large house-builders should be viewed against the likely housing market in 2015-2016. The first sector that is caught by changes will be small and self-builders, although larger builders with small sites may also be caught earlier.

Modelling work

23. The group was presented with data from initial technical and financial modelling carried out by the Zero Carbon Hub and Cyril Sweett. This indicated the technical and commercial feasibility of various steps between 2010 and the zero carbon standard (quarter, half, and three-quarter points were investigated). Updated analysis provided by the Part L contractor was also presented at the group's final meeting. The full costs report is being presented by DCLG to BRAC and should be read in conjunction with this report.

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Key points from the matrix for new build 2013

24. The matrix (see separate report) sets out the key questions for the members of the working group and tabulates the responses.

Level of Fabric Standards – no consensus

25. The four options given were no change, an interim FEE level, full 2016 FEES and other. The house builders wanted no change. The insulation industry wanted full FEES or better (the Spec C from the Zero Carbon Hub modelling); roofing, heating, hot water, electrical, renewables and insulated concrete formwork also wanted full FEES; glazing and masonry supported an interim FEE whilst timber frame wanted Spec C. It would seem from the Working Group discussions that a few sectors are nervous about full FEES citing concerns over SAP and thermal bridging. Whether sorting these concerns would cause them to support full FEES is moot.

Level of Carbon Compliance – no consensus

26. Unsurprisingly views were mixed. A majority supported setting the carbon compliance half way between 2010 and 2016, but several major sectors disagreed. The house builders’ view again was no change. Masonry wanted no more than 5-10% improvement from 2010. The renewables sector wanted the 2016 carbon compliance standard set for 2013.

Improvement phrased as Flat or Aggregate – majority view

27. All sectors other than timber frame wanted to see the improvements set as an aggregate improvement i.e. average over the whole stock, rather than a flat approach which would be the same level of improvement for all dwellings. As the house builders wanted no change in standards, they did not have a view on this.

Target set as Absolute or Percentage Improvement – majority view

28. Not as big a majority as the previous item, but a majority favoured absolute targets for carbon compliance. One sector in insulation would like a concurrent notional building, as in Part L2A.

Fuel Factors – majority view

29. It is worth noting how fuel factors are addressed in Part L1A 2010 - see Table 1 shown below.

Table 1 Fuel factor	
Heating fuel	Fuel factor ¹
Mains gas	1.00
LPG	1.10
Oil	1.17
B30K	1.00
Grid electricity for direct acting and storage systems	1.47
Grid electricity for heat pumps ²	1.47
Solid mineral fuel ³	1.28
Any fuel with a CO ₂ emission factor less than that of mains gas	1.00
Solid multi-fuel ³	1.00

Notes:
 1. The fuel factors in Table 1 will be kept under review as progress is made towards the zero carbon target.
 2. The fuel factor for electric heat pumps will be reviewed after the renewable heat incentive is introduced.
 3. The specific fuel factor should be used for those appliances that can only burn the particular fuel. Where an appliance is classed as multi-fuel, the multi-fuel factor should be used except where the dwelling is in a Smoke Control Area. In such cases the solid mineral fuel figure should be used, unless the specific appliance type has been approved for use within Smoke Control Areas.

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30. DCLG are required to review the heat pump Part L 2010 fuel factors once the Renewable Heat Incentive is in place, although it is not currently clear if RHI will be applicable to new homes. This should be addressed before Part L 2013 fuel factors are decided.
31. Notwithstanding the above, the majority of the members of the Working Group would be in favour of the removal of fuel factors (i.e. the TER should be the same no matter which fuel is used in the actual dwelling) although some would make this shift in two stages. The electric technologies, heat pump manufacturers and timber frame sectors would like to keep the fuel factors as present.
32. In the view of the heat pump industry, the original need for a fuel factor has changed little. They believe it is still necessary to avoid penalising electrically driven products since the policy decisions for decarbonising the grid have still not been taken. They see considerable uncertainty about projected CO₂ emissions levels as evidenced by the three levels used in the Hub analysis. HPA/FETA supports the publication of 15 year CO₂ projections by DECC, and would support a gradual reduction of the Fuel Factor if significant decarbonisation takes place or other support mechanisms are put in place. However, at present, neither of these conditions applies despite the planned introduction of schemes such as RHI.

Dwelling logbooks - consensus

33. All members agree that logbooks should be introduced but there are quite a few comments on the practicality and actual value in reality. It would appear that the issue for members is demonstrating value to the home occupant. If none or little can be demonstrated then logbooks would not seem to be useful.

Dealing with Design versus as-built performance in 2013 – areas of consensus

34. The working group accepts that homes may not perform as designed even before occupants are involved. There is a consensus that more evidence is required to establish the scale of the issue. Although some information is available (see Zero Carbon Hub report “Carbon Compliance for Tomorrow’s New Homes - A Review Of The Modelling Tool And Assumptions - Topic 4 Closing The Gap Between Designed And Built Performance” http://www.zerocarbonhub.org/resourcefiles/TOPIC4_PINK_5August.pdf, robust data for all the different types of construction, builders and services does not exist. Therefore the aim for 2013 should be to enable or encourage the collection of such data through voluntary means. Only one insulation company suggested mandatory testing.
35. At this point the views of the group become more diverse. There is a view that SAP (for both fabric and services) and particularly the treatment of thermal bridging need to be revised so as to get better estimates of ‘as designed’ performance. A number of members support more on-site testing for fabric and services; others view improvements in processes as key. Competent Persons schemes are mentioned and also more enforcement from Building Control.
36. If voluntary testing and data collection is going to happen then some carrot is needed to encourage participation. At this stage there is no agreement on what that should or even could be. However, the Compliance and Performance Group and in particular a Performance Sub-group have been grappling with the issue of what might be implementable in 2013. None of

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this should be taken to imply support for changing the original timetable in the Hub's Carbon Compliance report of at least 90% of homes by 2020 performing to the as designed levels. Rather it is an attempt to kick start voluntary data collection to help achieve the timetable and inform the 2016 regulations.

37. SAP issues are dealt with elsewhere including in the Hub reports and a separate paper from the Working Group as noted earlier in this report.

Existing homes and key points from the matrix for existing homes 2013

38. In terms of broader policy context, the two major influences in this area are the recast Energy Performance of Buildings Directive that the UK has to implement, and the forthcoming Green Deal.
39. In the EPBD the trigger level for compulsory upgrading the energy performance of buildings is no longer the 1000m² floor area but is the following:
- A major renovation is defined as either where the total cost of renovation is higher than 25 per cent of the value of the building, excluding the value of the land upon which the building is situated, or where more than 25 per cent of the surface of the building envelope undergoes renovation.*
40. There is also a requirement that such upgrades shall be 'cost optimal'. The UK government's view in the EPBD consultation was that our standards would probably meet this requirement. However this will need to be checked given changes in both building costs and energy costs.
41. The responses from the working group on possible changes for Part L1B are shown in the matrix. The key points are summarised below.

Performance requirements for 2013 – no consensus

42. One of the house builder representatives, the insulation sector, roofing and renewables wanted the standards for extensions to be equivalent to new build or better. The masonry sector wanted no change from 2010 levels and the controls sector pointed out the lack of compliance in their area.
43. Regarding replacement glazing, there are 3 methods of demonstrating compliance with regulations for replacement windows – a Window Energy Rating (WER), a whole-window U value or a glass centre pane U value. The 2010 requirements are WER band C, U_w 1.6 or centre pane U value 1.2 respectively. The industry would like to see all three methods of demonstrating compliance maintained.
44. The majority of trade association representatives in the industry support a move to WER band B in 2013 (with a commensurate improvement in U value). However, they acknowledge that a significant proportion of their "grass root" membership – generally SME window fabricators and installers – wish to see no change. The resistance to change is due to perceived extra costs for some products and a reluctance to continually change product specification.
45. It should be noted that different framing materials have different challenges in achieving improved U values and WER ratings. Retention of the centre-pane U-value option is necessary to enable slimline metal framed windows to continue to be used in like-for-like replacements.

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The industry consensus is that the existing limitations on the use of a centre-pane U-value set out in the 2010 Approved Documents L1B and L2B should not be extended beyond the present wording – but neither should they be further restricted, either by amendment to the AD or by DCLG Circular

46. One member specifically asked for party walls to become a controlled element so that existing party walls could be filled and hence improved. A number of trials have been undertaken on properties with party walls. Although these tests were performed on what might be regarded as new buildings the conditions of the party walls can be considered to be highly representative of the vast majority of party walls built since the introduction of Part E 2002, and reasonably representative of those built in the last 40 years. These trials have measured U-values in existing cavity party walls of at least 0.50 W/mK (Part L1A level) and that it is possible to reduce the U-value to zero by filling the cavity with mineral wool. The reports are:
- Stamford Brook: 6 houses Masonry Effective U-value 0.6 W/m²K
<http://www.leedsmet.ac.uk/as/cebe/projects/stamford/pdfs/del7coheating.pdf>
 - Elm Tree Mews: 1 house Timber Frame Effective U-value 0.4 W/m²K
<http://www.leedsmet.ac.uk/as/cebe/projects/elmtree/index.htm>
 - Bradford: 2 houses Masonry, Effective U-value 0.6 W/m²K
http://www.leedsmet.ac.uk/as/cebe/projects/eurisol/eurisol_short_report_final.pdf
 - Sadberge: 2 houses Timber Frame Effective U-value 0.5 W/m²K
http://www.leedsmet.ac.uk/as/cebe/projects/eurisol/eurisol_timber_frame_report.pdf
47. Another member wanted encouragement for changing to lower carbon intensity fuels.

Should consequential improvements be included – consensus

48. All members agreed that some form of consequential improvements was needed, but there was a range of views on the detail. The glazing industry would limit improvements to the legal necessities from implementing the recast of the EPBD and the timber frame industry would limit it to the elements being worked on in the first place. The masonry industry did not want to introduce a cost penalty for homeowners who have chosen to spend money on home improvements.
49. There were a number of members wishing to see a clear link to the Green Deal as a method of financing such work as well as a way of getting property specific assessment and recommendations at the time the home owner was contemplating work on the dwelling. Upgrading controls of services was mentioned, as were changes to detailed issues on roofing.
50. One member suggested further exploration of the ‘no net increase in emissions’ for extensions idea.

Fabric standards for new elements – majority view

51. The insulation, timber frame, roofing and glazing sectors were in favour of updating the standards to fit in with Part L1A 2013 whereas the masonry industry did not believe changes were necessary. In any case they did not wish to see U-values for walls improved beyond 0.26.

Fabric standards for retained thermal elements – not clear

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52. Some members wished to see upgrades, others did not but wanted a greater scope e.g. party walls. The flat roofing upgrade criteria needed to be changed to include overlaying on existing waterproofing as a trigger.

Domestic Buildings Services Compliance Guide (DBSCG)

53. Working group members were asked for their views on updates for the DBSCG. In general the view is that the guide needs to be made more consistent, and updated in view of EU Directives (especially ERPD). Some areas need updating and clarifying and the HHIC have set out a full list in their response that has general agreement in the services sectors.
54. The insulation sectors would like to see a greater application of insulation on hot and cold pipework as well as ductwork. The masonry sector would like continuous/quasi-continuous heating regimes as an option (see BS EN 13790).

SAP

55. The Zero Carbon Hub in their report Carbon Compliance for Tomorrow's New Homes (July 2010) recommended certain changes to SAP. A number of members of this group agree that these changes should be implemented for 2013.
56. There were many other specific requests for changes to SAP, relating to most areas including: occupancy patterns/behaviour; internal gains; the heating regime; ventilation; psi value calculations; overheating, thermal mass and decrement delay; cooling; secondary heating; lighting; hot water; appropriate services/technology combinations; communal heating; controls; Appendix Q. Details are shown in the SAP responses table which has been shared with DECC and the SAP contractor.
57. The heating and ventilation sectors requested that the Part L contractor investigate the application of controls to provide adequate indoor air quality, and how this might be rewarded.
58. The SAP software providers felt that the end-to-end process of a SAP assessment needs consideration. They cite consistency of data input and importantly the consistent use of conventions and the need for robust QA schemes. A suggestion is to QA 'design' calculations as well as 'as built' calculations to help this process. This would ensure that the work of Assessors is checked and corrected soon after SAP revisions go live, rather than a year or more later once dwellings are completed (see comments in document Part L 2013 update, WG1: Member feedback – SAP).
59. The Passivhaus Trust/ AECB proposed that Passivhaus compliant dwellings be given an optional 'deemed to satisfy' status under ADL1A. To support this they state that (i) Passivhaus performance is unquestionably in advance of any energy efficiency standard that might credibly be proposed for 2013, (ii) that it will normally also meet whatever carbon target is proposed without needing the use of renewable technologies, and (iii) that there is an independent Passivhaus certification scheme in operation in the UK, which operates in a

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competitive commercial market. They also recognise and accept the separate requirement to produce EPCs. There does not appear to be any disagreement in the Working Group for this proposal.

60. House builders cited the need for a credible scheme for thermal bridging details and the need for all areas of thermal bridging to be considered.

Community Heating

61. The guidance within the current Part L 2010 regarding the calculation and allocation of CO₂ emissions from communal energy systems is not consistent between ADL1A and ADL2A, which apart from being undesirable leads to potential issues on mixed-use sites where the network serves both domestic and non-domestic buildings. It is requested that the Part L contractor investigates this issue such that a consistent and logical approach can be taken.

Continued dialogue

62. It is requested that government continue the dialogue with industry regarding the changes for 2016 to make sure that any research/ investigatory work required has time to be carried out prior to the formal 2016 review, and to give industry confidence in the direction of travel and hence ensure deliverability. It was agreed that the chairman (as a non-executive director of the Hub) should start a dialogue with the Zero Carbon Hub on ways to set up a formal mechanism that would achieve this. In addition such a group should be proactive in developing industry views, together with robust and agreed data, in good time for the 2016 Part L review so that the issues with short timescales experienced with this review are not repeated.

John Tebbit, BRAC member: chair of WG1

Zero Carbon Hub: Secretariat

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Part L1A: New dwellings

Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
Current Practice	Part L 2010 compliant specifications requested from group members. The information has been used to inform the 2010 Baseline modelling work – see individual member feedback forms for details of submissions																		
Fabric Standards for 2013 Main choices are: - No change - Interim FEE (43/52) - 2016 FEES (39/46) - Other	No change from 2010 Late inclusion of party walls in ADL10 meant delivered CO ₂ saving much greater than 25%	No change from 2010 requirements unless LPA requirements for renewables are withdrawn, in which case: 2016 FEES	At most Interim FEE , given SAP shortfalls (especially linear thermal bridging).	2016 FEES , plus stipulated minimum air tightness of 3m ³ /m ² hr @ 50PA	Interim FEE , but at 42/55 (Based on SAP modelling work carried out for sector)	Approx. Spec C (i.e. further than FEES)	2016 FEES	2016 FEES	Spec C (i.e. further than FEES)	Interim FEE And no reason to change glazing backstop values	2016 FEES	–	–	2016 FEES	2016 FEES	–	–	2016 FEES	–
CO₂ Standards for 2013: Level	No change , but begin to address the performance gap	No change on 2010	No change , but tackle the performance gap	As per the fabric standard alone (i.e. the equivalent of '2016 FEES Plus')	No more than 30-35% CO ₂ reduction on 2006	–	Balance, based on growth of the housing sector and the materials and solutions available in the market place	Half-way point to 2016 CO ₂ standards	Half-way point to 2016 CO ₂ standards	Half-way point to 2016 CO ₂ standards Flexibility on individual elements preferred.	Half-way point to 2016 CO ₂ standards	–	–	No change in terms of building services elements – because of SAP shortcomings when dealing with products	Standard should be set at such a level as to require both fabric improvements and 'green' technologies	Half-way point to 2016 CO ₂ standards	No more than 25% CO ₂ reduction on 2010	Advocate introduction of 2016 Carbon Compliance standards in 2013	–
CO₂ Standards for 2013: 'Flat' vs. aggregate standards	Aggregate	Aggregate	Aggregate	–	Aggregate	Flat	Aggregate	Aggregate	Aggregate, but based on concurrent notional	Aggregate	Aggregate	–	Aggregate	–	Aggregate	Aggregate	–	–	–
CO₂ Standards for 2013: 'Absolute' vs. percentage reduction	Absolute	Absolute (but explore concurrent notional)	Leaning towards percentage reduction	–	No strong view, but leaning towards absolute	Percentage reduction (for continuity)	Absolute	Absolute	Concurrent notional	No strong view, but leaning towards percentage reduction	Absolute	–	Absolute	–	–	Absolute	Absolute	–	–
CO₂ Standards for 2013: Fuel Factors Should they be removed or kept?	Remove fuel factors (but with alternative market stimulus if long-term solutions disadv.)	Remove fuel factors (but with alternative market stimulus if long-term solutions disadv.)	Makes sense to remove fuel factors, but erring towards partial phase-out in 2013	–	No strong view but needs stability and clarity going forwards	Keep fuel factors as per 2010 (for continuity & simplicity)	–	Remove fuel factors	Remove fuel factors	–	–	Need clarification on implications prior to giving a view	Boiler manufacturers = Remove fuel factors Heat pump manufacturers = Keep fuel factors	Keep fuel factors at 2010 levels	Remove fuel factors	Keep fuel factors at 2010 levels, unless grid decarbonisation takes place or other support mechanisms are introduced in which case start gradual phase-out	Understand the need to remove	–	–
Dwelling logbooks Should these be introduced?	Highly desirable	Qualified agreement to introduction, subject to detail	Yes , agree would be useful	–	Introduction essential	–	Introduction essential	–	Potentially useful but need to be simple/ clear. In future, technology may alert occupant to need for maintenance.	Good idea in theory, but believe will not work in practice	Yes , agree would be useful	–	Yes , agree would be useful Needs to demonstrate which services have been installed.	Yes , but needs time to be robustly developed	Good idea in theory, but believe will not work in practice	–	Yes , and should include maintenance section	–	–

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Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
<p>Design vs. as-built standards What form of support required in 2013?</p>	<p>Gather evidence. Address thermal bridging issues.</p>	<p>2013 should signal clear intention. Joint industry/ government monitoring programme should be set up to provide evidence. Test results should not be linked to compliance. Confidence factors preferred over safety factors.</p>	<p>Believe that thermal bridging plays a large part in difference between designed and as built performance. Therefore, a comprehensive set of psi value details and pattern book for take-offs would be helpful. Make SAP more accurate.</p>	<p>Believe that 'FEES Plus as-designed' would be a significant step forward for 2013 - so at most introduce an interim requirement in 2013 to pave the way for full, mandatory as-built compliance in 2016. 'Confidence Factors' could be useful in this respect.</p>	<p>Advocate industry-led best practice initiative rather than future legislation. Concerns over SAP.</p>	<p>Interim regulatory support not required. Building Control need to ensure standards are being met.</p>	<p>Support for 'as-built' standard expressed in principle. No indication of preferred form of regulatory support.</p>	<p>Believe there to be clear evidence of a performance gap. Incentivise whole-house fabric test (e.g. coheating test) to build evidence base. One member goes further to suggest mandatory coheating tests. BBA/ TIMSA U-value competency scheme may provide useful lessons.</p>	<p>Believe it impractical to test post-construction. But is a need to drive for better processes during construction (e.g. adequate site supervision). If this not proved to be the case, then downgrade dwelling's calculated design performance. Require builder to sign-off dwelling as complying with design and product installation requirements.</p>	<p>On-site testing is required, but want to ensure good design solutions from outset - ACDS may prove useful in this respect.</p>	<p>Enhanced on-site testing or checking is required. Rigorous Competent Persons Schemes should be further developed to assist.</p>	<p>–</p>	<p>On-site testing required to build evidence base. Installed performance of services / technologies also needs to be established.</p>	<p>Does not support any move towards assessing as-built performance in 2013. More research/ data required to better understand this important area – both on fabric and services.</p>	<p>–</p>	<p>Combination of MCS regulation and EU directives should have a significant effect on as-built performance of heat pump technology.</p>	<p>–</p>	<p>Support the move to as-built performance.</p>	<p>–</p>

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Part L1B: Existing dwellings

Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
Performance requirements for 2013	–	–	Should be brought into line with new build fabric and heating requirements where feasible and appropriate	–	No significant changes required. Potential to improve actual performance by concentrating on closing any potential 'performance gap'	–	–	Include party wall as controlled building element – to help eliminate party wall bypass in existing dwellings	Improve performance requirements to 2013 new build levels, but ensure economically viable within payback period (& make this the same as Green Deal methodology). Extensions should be treated as per new build but with 'greater design flexibility' as per Scottish approach	Retain current ways of demonstrating compliance. Would like to work with DCLG on improved glazing performance requirements and conservatories (if being considered). Would like definition of conservatory reintroduced and propose wording in full response.	Extensions should be treated as new build. Rigid links with Green Deal should be made and enshrine principle of Consequential Improvements	–	Careful consideration required regarding the ability of existing systems to provide adequate heat when extensions are constructed. Propose 10m ² threshold. Especially significant for heat pumps as less likely to be oversized.	Compliance with regs should be improved. Anecdotal evidence that requirements for boiler controls and heating zones not being followed in large number of cases. Primary concern is lack of robust processes for existing measures.	Should encourage change to lower CO ₂ emissions fuel. e.g. solid fuel installation replaced with biomass installation; oil boiler replaced with B30K installation.	Link with/ inform Green Deal Requirement to upgrade existing fabric if extension greater than threshold of, e.g. 25% of existing volume	–	Demanding CO ₂ standards should be imposed on entire building when significant refurbishment takes place.	Compliance with regs should be improved. Anecdotal evidence that requirements for heating controls and heating zones not being followed in large number of cases.
Consequential improvements Should consequential improvements form part of the regulations?	–	–	–	–	If introduced, need to link to Green Deal finance. Careful not to constrain home owners improvement plans by introducing cost penalty.	Yes but to limited extent and only if works proposed to those elements anyway.	–	Yes definitely: - Link to green deal/ ECO - property specific assessment - apply to durable & long lasting measures (e.g. fabric first) - shift regs to in-situ performance - equitable requirement for proof of performance of elements	Yes. e.g. if undertaking an extension, existing building should be improved in line with Green Deal recommendations. Follow Scottish approach? Trigger points should be tightened.	No need to go further than Implementation of Article 7 of recast EPBD, and use >25% of building value undergoing refurbishment as trigger. Do not want to deter home owner from undertaking planned improvements.	Yes definitely – linked to Green Deal. Triggers should be made simpler and be clearly defined. Should be no differentiation in requirement for pitched and flat roofs. Overlaying an existing waterproof layer should be a trigger.	–	No net gain in emissions when works carried out is worth pursuing	Yes. Make boiler replacement a trigger for fitting of controls to new build standards. Fitting of insulation (i.e. reducing heat demand) should trigger fitting of controls to new build standards on heating system.	Yes. e.g. when extension added, should ensure existing heating system upgraded to match change in demand.	–	–	Yes – linked to Green Deal	–
Fabric Standards: New thermal elements	–	–	–	–	No changes required. Wall U-value should not go beyond 0.26W/m ² K	Update to align with ADL1A 2013 requirements.	–	Update to broadly align with ADL1A 2013 requirements, possibly implemented at elemental level	Update to align with ADL1A 2013 requirements. Follow Scottish approach to use of whole building TER?	Agree in principle to updating elemental standards	Update to align with ADL1A 2013 requirements.	–	–	–	–	–	–	–	–

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Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
Fabric Standards: Upgrading retained thermal elements	–	–	–	–	–	Update to mirror requirements proposed in ADL1A	–	Leave improvement values as 2010 but include party walls to be improved to effective U-value = zero. Threshold values should be updated to reflect cost benefit for period 2013-16	Improve performance requirements to 2013 new build levels, but ensure economically viable within payback period (& make this the same as Green Deal methodology). But do not restrict upgrade works to only Green Deal measures. Trigger point for flat roof improvement should include 'waterproofing the external surface of the thermal element'	Agree in principle to updating elemental standards	Amend ADL1B Table 3 to match ADL1B 2010 Table 2 values. Careful not to put off home owner from making repairs to roofing.	–	–	–	–	–	–	–	–

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Domestic Building Services Compliance Guide

Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
Compliance Guide What needs to be updated for 2013?	–	–	Needs to be fluid as an alternative Appendix Q route to ensure new technologies can be implemented	–	Continuous/ quasi-continuous heating regime should be option (as per BS EN 13790)	–	–	Needs to be wider application of insulation to pipework runs. Would welcome involvement in review of relevant areas.	Full length insulation for hot and cold water pipes. Level of insulation for ventilation ducting should be considered.	Update to comply with as much of recast EPBD as possible.	–	–	Overall consistency needs to be improved. No major changes required to section: 2.2, 2.5, 13 Might be beneficial to include section on hot water storage and how links to various technologies. Updates/ clarity required to section: 2, table 2, 6b; 6, table 26, 3 (see full submission for details)	Compliance Guide should be mandatory. Clearer text would also assist compliance. Echo HHIC's response in terms of specific changes (see left)	Updated to take account of ErPD, labelling and appliance/ system efficiencies Clear guidance required for specifiers, designers & installers.	Needs updating - ENER 1 European standard will apply from 2013.	Minimum efficiencies should remain at 2010 levels	–	Compliance Guide should be mandatory. Other suggestions echo those of HHIC (see left)

Product Performance

“For your sector, please give details of likely best product performance available for mass scale use within new homes and upgrades to existing homes from 2013”

Structure – Masonry (MMA/ APA/ CBA/ MPA/ BDA)

Masonry/ concrete products and construction methods can deliver the highest levels of fabric performance. Taking into account downturn in construction, to encourage growth suggest following values for 2013:

External wall - 100mm cavity preferred (0.25-0.28 W/m²K); Party wall 0 W/m²K; Y-value 0.06 W/m²K; Airtightness 5-7 m³/hr.m²; Floor 0.14W/m²K

Structure – Timber frame (UKTFA)

Spec C is a good product, giving high levels of performance and is practical for 2013. U-values 0.15W/m²K; Airtightness around 1 m³/hr.m²; Y-values 0.04 W/m²K.

Structure – ICF (ICFA)

For new homes: External walls 0.15W/m²K; Party wall 0 W/m²K; Y-value 0.035 W/m²K; Airtightness less than 3 m³/hr.m².

Insulation – Mineral (MIMA)

Insulation thicknesses can be increased to deliver improved standards. Significant improvement of unit thickness performance of mineral wool products unlikely. Workmanship on site is crucial to achievement of designed performance in reality.

Insulation – Rigid (BRUFMA/ BPF/ EPFA)

Specifications and products are currently available to achieve Spec C and beyond.

Roofing (roofing sector)

New: can achieve 0.11W/m²K if necessary. Existing: 0.18W/m²K pitched roofs; 0.13W/m²K flat roofs. Anything more onerous may require new designs/ practices rather than new products.

Heating & Hot water (HHIC)

As per Domestic Building Services Compliance Guide (2010), plus passive flue gas heat recovery devices for hot water performance.

Elec tech (BEAMA)

No change in performance for 2013. Currently available technologies need to be adopted.

Oil tech (OFTEC)

No change in performance. CO₂ improvements should be via switching to lower CO₂ emission fuels.

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Other

Sector	Warranty Provider	House builder	House builder	Sustainable Building Assoc.	Structure – Masonry	Structure – Timber frame	Structure – ICF	Insulation – Mineral	Insulation – Rigid	Glazing	Roofing	Ventilation	Heating & Hot water	Elec tech	Oil tech	Heat Pump tech	Solid fuel tech	Renewables tech	Controls
Area	NHBC	HBA / HBF	House builder	AECB / Passivhaus Trust	MMA/ APA/ CBA/ MPA/ BDA	UKTFA	ICFA	MIMA	BRUFMA/ BPF/ EPFA	Glazing Sector	Roofing Sector	RVA/ FETA	HHIC	BEAMA	OFTEC	HPA/ FETA	HETAS	REA	TACMA
Other comments	Gather evidence to properly inform 2016 changes.	–	–	Passivhaus-compliant dwellings should be granted 'deemed-to-satisfy' status in PartL1A 2013. Believe that Passivhaus performance is unquestionably in advance of any energy efficiency standard that might credibly be proposed for 2013, and that it should also meet whatever carbon target is proposed, without the use of renewable devices. <i>(see full submission for detailed reasoning)</i>	Responses informed by objective to support recovery in house building market. Review of air quality issues in very air tight homes needed. Sector is sensitive to significant changes in proposals post-consultation.	–	The need to move forward should be tempered with moderation due to economic climate. But important not to take eye of the ball.	Guidance on party wall bypass too vague at present and should be tightened. Have proposal for this.	Careful consideration of how to ensure compliance is required. Need to ensure build is as designed. SAP outputs should flag up elements for BCB checks. SAP assessors for design stage calculations should be accredited OCDEA's. U-value calculations should be carried out by Competent Persons. Transitional arrangements need to be per plot not per site. Importance of airtightness should be given more prominence in revised ADs.	Timescale of review too tight too allow for adequate consultation with glazing industry. Do not want to see use of regional weather within compliance calculations.	Is possible that improved performance requirements coupled with PV requirements may lead to greater use of SIPs in the future. This will be welcomed by some, resisted by others.	Request that main contractor for Part L work investigates the application of improved/ advanced control of ventilation to provide adequate indoor air quality, and how this might be rewarded.	–	Move to forward rolling carbon factors by 2013. Include provisions for home charging of electric vehicles. Water treatment and under floor heating should be notifiable activities.	ErPD needs to include same approach to encouraging lower carbon fuels by way of incentives.	–	–	Support a move to the use of regional weather data in order to ensure that the contributions from renewable technologies can be more accurately specified at the design stage (in particular the solar technologies)	–

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Collation of SAP Responses

The following table lists the responses from members of WG1 when asked to provide details of specific areas within SAP which they believe need to be updated for 2013, and details of specific products which they believe are not adequately dealt with in SAP currently. These views are presented on a topic by topic basis. These comments have been produced as additions to the recommendations for changes to SAP contained within the Zero Carbon Hub's Carbon Compliance for Tomorrow's New Homes report (July 2010), which group members fully endorse.

Area	Responses
Energy Related Products Directive/ Ecodesign	<p>See report of the sub-committee on integration of ErP into SAP which was initiated by HPA/HHIC/FETA. <i>[HPA/ FETA]</i></p> <p>The impact of Ecodesign in current Lots about to be launched (1&2) as well as future ones (10,15,20,21) should be assessed by BRE with industry's input so that SAP can, to a degree, future proofed. <i>[HHIC]</i></p> <p>Lot 10: The general principles of how smart controls etc are being dealt with seem to be established now, so SAP could be prepared to accommodate them. <i>[BEAMA]</i></p>
Occupancy patterns/ behavioural change	<p>The standard occupancy patterns and internal temperatures assumed within SAP mean that any savings calculated for measures are predicated on the assumption that controls are present to maintain these standard conditions. No benefits are assigned to programmers, or programmable room thermostats, under SAP as it is assumed that behaviour changes are required to achieve any savings compared to the standard conditions. To be consistent, it should be insisted that homes have the basic controls to maintain standard SAP conditions before any SAP benefits can be assigned for other measures. <i>[TACMA & BEAMA]</i></p> <p>There is no allowance within SAP for behavioural energy savings, even where technologies may facilitate such behaviour. Yet such allowances have been introduced in CERT for smart meters and advice. There needs to be a separate process alongside SAP to fairly determine the behavioural impacts of different measures. <i>[TACMA & BEAMA]</i></p> <p>Occupancy profiles should be updated <i>[HBA/HBF]</i></p>
Internal gains	<p>The assumed number domestic appliances in the average home needs reviewing to reflect recent growth and the resulting rise in internal heat gains. <i>[MMA, APA, CBA, MPA, BDA]</i></p> <p>With the growth of domestic appliances the heat gain from these needs further consideration. <i>[ICFA]</i></p>
Heating regime	<p>For SAP to be consistent with BS EN 13790 (as claimed) it should include the option of a continuous or quasi-continuous heating regime, which is detailed in the standard. <i>[MMA, APA, CBA, MPA, BDA]</i></p>
Ventilation	<p>Ensure that SAP reflects appropriately Part F 2010 <i>[ZCH/ AECOM]</i></p> <p>We do not advocate any changes to the back stops in ADL1A, for domestic ventilation products. The industry have made considerable efforts to develop and invest in products that are tested under the SAP Appendix Q methodology where energy use has been driven to very low levels. We do not advocate any changes to the back stops in ADL1A, for domestic ventilation products. The industry have made considerable efforts to develop and invest in products that are tested under the SAP Appendix Q methodology where energy use has been driven to very low levels. <i>[RVA/ FETA]</i></p> <p>Efficient stoves, etc, penalised by block penalty for heat going up the chimney when the appliance is "out". Tests whose results have been with BRE show much lower numbers than the 20 now used and more importantly developments in the industry towards appliances that take their combustion air from outside the building now becoming available. <i>[HETAS]</i></p>

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Area	Responses
Psi value calcs, etc	<p>Liner thermal bridging take off has not been finalised for 2010. By way of an example, not all lengths are currently calculated under and Table K1 and indeed separate psi values are required if the K1 penalty is not applied (circa £200 to £300 per detail to be calculated). <i>[House builder]</i></p> <p>Support in the form a comprehensive set of psi value details and a detailed pattern book take off would be massively advantageous to industry. This would ensure that all Assessors consider all of the linear thermal bridging. <i>[House builder]</i></p> <p>Also a suggestion from ‘Accredited Construction Details - Scheme Requirements Workshop’, with a general approval from those in attendance was for a central register of approved accredited thermal details (potentially as part of the PCDF) so that specific thermal bridging details (once schemes are operational) could be entered into SAP, with any entered psi value from a non scheme source automatically having confidence factor applied (obviously however discussions are still ongoing on the whole accredited schemes side of things). Representatives from both Elmhurst and NHER suggested that this was something to maybe consider for 2013 reg’s change and SAP version. <i>[BRUFMA, BPF & EPFA]</i></p> <p>Greater attention needs to be brought to the conventions relevant to thermal bridging especially with regard to all relevant junctions being included and additionally accurate measure of lengths for the correct inclusion of psi values. For example the guidance and conventions currently omit default psi values for many of the junction types that occur in room in roof constructions. <i>[MIMA]</i></p>
Overheating / thermal mass	<p>The overheating check would benefit from an upgrade, which among other things should take account of climate change and decrement. It should also become a mandatory requirement that all new dwellings pass the overheating check. Since Part L deals with the conservation of fuel and power (and not comfort) perhaps compliance could be achieved by setting a limit on the amount cooling energy needed to maintain an acceptable internal temperature. This would take advantage of the fact that cooling energy is now calculated by SAP2009 as part of the FEES. Hopefully, this approach would also avoid the need for a new regulation covering overheating. <i>[MMA, APA, CBA, MPA, BDA]</i></p> <p>Overheating is a very misunderstood element and this is not adequately catered for climate change and thermal mass need revisiting and more importantly decrement values. ICF construction is not adequately catered for - this unique wall construction with high thermal mass and a perfect decrement value is currently being considered as no better than lightweight timber frame!! <i>[ICFA]</i></p> <p>We would appreciate some sensitivity analysis into how the TMP affects energy efficiency/responsiveness results in the final calculation. <i>[BEAMA]</i></p> <p>Overheating – use of dynamic thermal modelling? <i>[HBA/HBF]</i></p>
Cooling	<p>Installed air conditioning and heating and ventilation solutions capable of providing air conditioning should be taken account of fully within SAP for additional energy use associated with any air conditioning which may be used to reduce temperatures during summer peak temperatures. The consideration being, if a system is installed and capable of being used to reduce temperatures, then the likelihood is that the occupier will use it to do so during very hot periods. <i>[BRUFMA, BPF & EPFA]</i></p>
Secondary heating	<p>Where a wood burning stove is installed as a secondary heating source, we would recommend SAP is altered to allow the actual percentage of heat load provided to the dwellings rather than the 10% currently allowed for. Some stoves and stove boilers can provide significantly more than 10%. <i>[HETAS]</i></p> <p>Where an appliance has a dedicated external air supply, we would recommend the requirement for a flue be removed from SAP. <i>[HETAS]</i></p> <p>The secondary heating value of 10% is questioned by the gas fire industry and a survey is currently being undertaken to determine a more accurate figure. Results will be available early September 2011. <i>[HHIC]</i></p>
Lighting	<p>Account for LED lighting <i>[Lighting Association]</i></p>

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Area	Responses
Windows	<p>Table 6e could be updated to include new glazings and “warm edge” spacer bars for windows and more information for doors based on glazing area and solid with insulated panels. This would be a great assistance to compliance. <i>[Trade Associations in the Window and Glass industries]</i></p> <p>One suggestion that I’ve had suggested from green deal group discussions would be for Window Energy Rating (WER) backed glazing information to be entered into PCDF, so specific windows can be selected directly from the database, thereby acting as a spur to developers to optionally use specific rather than generic information in calculations. <i>[BRUFMA, BPF & EPFA]</i></p>
Ductwork	<p>Where SAP currently allows for ductwork for ventilation to be ‘insulated’ or ‘uninsulated’, worth considering allowance for the level of insulation to be considered as per non-domestic requirements. Particularly ductwork with heat recovery capabilities, and efficiency of the recovered air. <i>[BRUFMA, BPF & EPFA]</i></p>
Hot water	<p>Treatment needs updating – incentivise reduced emissions from hot water <i>[HBA/HBF]</i></p> <p>The water demand and specification of the hot water system should be based on the size and the most likely intended use of the property. <i>[BEAMA]</i></p> <p>Analysis of the hot water demand based on the floor area seems to give a low figure; using the TFA calculation, a small 3 bed property will have a different occupancy level compared to a large 3 bed property, however, in reality occupancy levels are unlikely to be any different. A typical 2 bedroom properties of circa 50 to 60m² floor area will give an assumed occupancy of between 1.69 and 1.98. Surely the expectation for a 2 bed property would be that >2 occupants could be present? The argument holds for increasing floor areas, i.e. a floor area of 200m² gives an occupancy of 3.001 but these sort of areas will be large properties of 4 bedrooms or more. The water heating requirement is based on the assumed occupancy level so underestimation could lead to too small a water heater being specified. Figures produced by the Zero Carbon Hub comparing SAP 2005 to SAP 2009 hot water demand for a range of houses show a demand reduction ranging from 24% to 34%... this is almost certainly due to occupancy effects rather than greater efficiency. This indicates the importance of getting the figure correct. <i>[BEAMA]</i></p>
Heat pumps	<p>rdSAP when used for EPCs gives no credit for installed heat pumps. This obvious anomaly needs to be addressed promptly. <i>[HPA/FETA]</i></p> <p>Heat pump performance factors in SAP should better recognise the influence of low temperature heat emitters. Data on this is available if SAP/BRE has the time and appetite to look at it. <i>[HPA/FETA]</i></p> <p>SAP should include the matching of hot water cylinders to heat pump outputs. This has been started in SAPQ for heat pumps and should be a standard element of guidance. <i>[HPA/FETA]</i></p> <p>HPA/Feta see the need for consideration of buffer tanks in heat pump heating systems. The same comment as 4/ above applies. <i>[HPA/FETA]</i></p> <p>HPA/Feta agree with the Hub report which uses SAP 2009 heat pump SPF defaults for the time being while EST Trials phase 2 is completed, SAPQ can be assessed, and the full effect of MCS installer standards can be monitored. <i>[HPA/FETA]</i></p>
Micro CHP	<p>For micro CHP, the APM which feeds into SAP is being reviewed and may have an impact on SAP. Feedback to by early July latest. <i>[HHIC]</i></p>
Solar Thermal	<p>Refinements to the methodology required, for example: solar storage volume factor, use of second order coefficients – detailed paper available <i>[REA]</i> – <i>This paper has been provided to DCLG and the SAP Contractor</i></p>
Communal heating	<p>Treatment of communal heating and LZCs generally needs to be updated – performance tables are outdated and crude. <i>[HBA/HBF]</i></p>

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Area	Responses
<p>Controls</p>	<p>With respect to ERPD/Eco-design for water heaters: the working model for Lot 2 gives credit for the inclusion of smart control (essentially relating hot water production to water usage patterns). We believe that DECC should urgently develop smart control definitions along with standardised energy savings within SAP. [BEAMA]</p> <p>New technologies (currently available): [TACMA & BEAMA]</p> <p>SAP needs to recognise some of the technologies being developed; areas that should gain recognition are features that develop behaviour changes in occupants eg further zoning and recognition of TPI as load compensation. Open protocol modulation control should be recognised as the most effective way forward.</p> <p>The SAP methodology needs to be able to assign benefits to the full range of control types that are currently available, particularly for temperature and zone control.</p> <p>With respect to new technologies particular priorities include modulating room thermostats, ‘proper’ weather compensation and wireless TRVs. Especially for high heat demand existing buildings, these controls can reduce heat input and this is not recognised in SAP 2010.</p> <p>It should also be possible to specify the effect of control accuracy. Control impacts should be consistent with other legislative mechanisms (e.g. Ecodesign).</p> <p>Unless SAP recognises these features further technological development on controls is likely to stop as this is a commercial market and there are incentives to avoid the use of the best technology in favour of cheaper equipment that provides equivalent benefit in SAP.</p> <p>The approach to calculating the effect of controls should be reviewed to ensure that the effect of controls relates to the balance of heat required to heat delivered and is not limited to an impact on (already high) boiler efficiencies.</p> <p>There needs to be a defined process for the incorporation of new technologies into SAP that is reasonable and consistent for manufacturers. The ADEPT model for the assessment of controls must be validated as this may offer a suitable and cost effective route to assess the performance of controls in a range of standard house types.</p> <p>New technologies (near future): [TACMA & BEAMA]</p> <p>Need to future proof SAP to accommodate dynamic controls and communications that could be brought to market in the near future, but for which SAP is currently a barrier.</p> <p>The move to zero carbon homes, the roll out of smart meters and the potential development of a smart grid mean that the role of controls and communications will perform a critical role in managing energy use in buildings and at a macro scale. As a policy tool SAP must be able to evaluate the benefits of such technologies.</p> <ul style="list-style-type: none"> • Integrated control options for heating, hot water, lighting and ventilation. • Prioritisation of renewable sources of heat from local sources and their use for particular applications. • Prioritisation of fuel used by the grid in relation to carbon content, differential tariffs or overall load management. • Accommodation of the rising importance of incidental gains. • Accommodation of load management by occupants determined by control interfaces available and tariff incentives offered. <p>The current static model has a limited ability to measure the benefits of sophisticated technologies and design approaches and a full dynamic model should be considered.</p> <p>Basic weaknesses in current methodology: [TACMA & BEAMA]</p> <ul style="list-style-type: none"> • Floor heating on/off patterns are the same as radiator systems in SAP, which is not reflective of reality.

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Area	Responses
	<ul style="list-style-type: none"> • On/off patterns are applied similarly to heat pumps as boilers, which again is not reflective of reality. • Controls and metering for community heating are not well treated. <p>Impact on underfloor heating: [BEAMA]</p> <p>In practical applications, underfloor heating functions on a multi-zone basis, providing time and temperature control on a room by room basis. We currently assume that any lost performance from responsiveness could be gained back by ensuring heat is provided when and where required.</p> <p>Responsiveness: [BEAMA]</p> <p>What is the measure point for responsiveness? i.e how is it calculated? Is it related to a centre room, for example?</p> <p>We believe that the base case for electric in a concrete slab is a mineral wire in the slab. This is an old approach and modern methods would improve responsiveness. UHMA members also cannot understand how the figures relate to reality. In effect the best responsiveness is a timber floor yet we know from common sense and experience that there is greater responsiveness in conducting heat through say a tile than a wood floor.</p>
<p>Appendix Q</p>	<p>There are a number of products that have been brought to market, that claim to achieve carbon reductions, however these can never be evaluated through SAP, in particular Appendix Q. Innovators are required to invest a disproportionate amount of money in order to make an appearance with the Appendix Q route. This needs to be simplified and a quicker route to SAP established, whether this be through a, another UKAS accredited testing body or even Universities. <i>[House builder]</i></p>
<p>General / Other</p>	<p>There is an opportunity to tighten up the performance gap by making the SAP tool more accurate compliance tool, ensure that all software houses are on a level playing field in terms of a user interface and technology options. <i>[House builder]</i></p> <p>Suggest EPC recommendations be added to design stage calculations to inform developer / builder what they could achieve if they pushed beyond initial proposals. <i>[BRUFMA, BPF & EPFA]</i></p> <p>SAP is frequently being used as a design tool by developers as well as a compliance tool; Whilst noted that it has not been built that way, people specify and build to whatever is necessary to achieve a pass, possibly without considering whether the servicing strategy will work. It maybe needs some kind of reality check built into the calculation to flag up whether an inputted specification may have problems when under peak load (rather than SAP default numbers) or under poor external conditions e.g. where a specific heating system is specified, but in reality it would be undersized where external conditions very cold. <i>[BRUFMA, BPF & EPFA]</i></p> <p>Products which are not adequately dealt with in SAP currently include closed cell in-situ injected PUR seamless cavity wall insulation and sprayed closed cell PUR loft (warm roof) insulation. Significant improved Air Tightness has already been achieved after installing these products in existing dwellings. These products have been <i>proven in use for over 25 years to be the most economical, efficient and practical solution</i> for many of the properties designated as being Hard-To-Treat-Homes in the <i>Green Deal</i>. <i>[Isothane]</i></p> <p>In terms of technologies not covered by SAP, hybrids are becoming increasingly available and can presently only be assessed through Appendix Q. This is probably an ongoing debate and not an area that can be fixed quickly. <i>[HHIC]</i></p> <p>For existing homes a better tool might be one that links building data with actual energy use measured by a smart meter. Such an approach would be more accurate, in taking account of both performance and behaviour. It could also allow energy suppliers to identify and address the worst performing properties, possibly being targeted through directly measured energy savings under a supplier obligation. <i>[TACMA & BEAMA]</i></p>

Part L 2013 Review – WG1: Domestic Working Group

Area	Responses
	Include daylighting calculation [HBA/HBF] Facilitate industry involvement to develop software applications to suit needs. [HBA/HBF] Implement all recommendations in Zero Carbon Hub Carbon Compliance for Tomorrow's New Homes Report as a matter of urgency. [AECB/Passivhaus Trust]

Additional feedback from members of the EPC Accreditation Schemes is as follows:

We support the idea of further developing the Products Characteristics Database to include details of performance of specific products in areas other than boiler, heat pumps, mechanical ventilation systems, FGHRs and WWHRs. This works well for the systems currently included and provides a practical way of improving SAP. The database could house details of all manner of technologies as long as there are agreed methodologies and systems for testing them. Technologies that could be added include solar thermal systems, secondary heating appliances, and thermal bridging details. Alongside this we recommend a review of SAP default values to ensure that they provide an incentive for continued improvement of products.

There is more to improving SAP than improved algorithms and better product data; the end to end process of a SAP assessment needs consideration. Of crucial importance is consistency of data collection and entry to software between Assessors. As SAP gets ever more complex the need for this becomes ever greater. The key issues here in our view are the application of consistent conventions, accompanied by robust quality assurance of EPC schemes and Assessors to ensure these conventions get applied in practice and that Assessors remain competent. Of particular concern at present is the quality assurance process itself. Currently, all QA of EPCs and Building Regulations Submissions happens once the dwelling has been completed. This means that the work of Assessors following a SAP revision is not checked until 12 – 18 months after the Regulations change. For example, Part L2010 introduced a significant increase in data collection and entry, in particular for thermal bridging where instead of entering a single 'y value', a complex calculation needs to be carried out involving the entry of typically 20 or more data items. This process is highly prone to error. Yet despite Part L 2010 coming into force in October 2010, few if any Assessors will have had any QA checks carried out on their calculations.

What is needed in our view is QA checks at both the Design and As Built stages. 95% of the work of a SAP assessment happens at the Design stage and it is here that the Assessors calculations need checking. At the As Built stage it is simply a matter of checking that the Assessor has gathered the appropriate evidence to complete the SAP assessment. Our suggestion is for a QA regime based upon say 1% checks at Design stage and 1% at the As Built stage, instead of the current 2% at As Built stage. With the current system dwellings are highly likely to be built based upon erroneous calculations that cannot be rectified because the dwellings will have already been built when such errors are found. However good we make the SAP calculation itself, the process of doing a SAP assessment in practice has to work effectively as an end to end process