



Department for  
Business, Energy  
& Industrial Strategy

# CHANGES TO GOVERNMENT'S STANDARD ASSESSMENT PROCEDURE (SAP): GOVERNMENT RESPONSE



November 2017

# CHANGES TO GOVERNMENT'S STANDARD ASSESSMENT PROCEDURE (SAP) GOVERNMENT RESPONSE

The consultation can be found on the BEIS section of GOV.UK:

<https://www.gov.uk/beis>

Changes to Government's Standard Assessment Procedure (SAP) Government Response

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# Introduction

The Standard Assessment Procedure (SAP) is the UK methodology for assessing the energy and environmental performance of homes.

SAP has a fundamental role in driving energy savings at household and national levels. It underpins modelling for policies that drive carbon savings and bill reductions, and allows for the creation of Energy Performance Certificates (EPCs). For new dwellings, SAP is the vehicle for demonstrating compliance with Building Regulations, giving it a vital role in Government's efforts to improve our housing stock.

Reduced data SAP (RdSAP) is the simplified methodology for use on existing dwellings to produce Energy Performance Certificates, which are required at point of sale or rental and used to support policy delivery for many Government schemes, including the Feed in Tariff and the Renewable Heat Incentive scheme.

SAP was last updated following a review in 2012. In November 2016, Government consulted on changes to how SAP (including RdSAP) assesses the energy performance of homes, to keep pace with research, innovation and technology developments. This document sets out our response to that feedback, to be reflected in the updated version of the methodology, SAP 10 (referred to as SAP 2016 within consultation document and draft SAP specification).

The SAP consultation included technical documents that provided the reasoning behind the main changes, as well as some discussion of likely impact. These can be found in their original form on the Gov.uk, alongside this document.

The consultation proposed revisions to the SAP 2012 specification Appendices S and T, which form the methodology for RdSAP. We aim to introduce the revised version of RdSAP in November 2017 to support the smooth implementation of private rented sector legislation. These revisions will take effect across the UK.

We expect the SAP 10 methodology to be published in 2018, but it may be used by Government for modelling purposes before publication. This publication will not bring the changes to SAP into force. This will be subject to consultation on changes to the Building Regulations.

The Government has commissioned an independent review of Building Regulations and fire safety in England, being led by Dame Judith Hackitt<sup>1</sup>. The review is due to report in spring

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<sup>1</sup> [www.gov.uk/government/news/independent-review-of-building-regulations-and-fire-safety-publication-of-terms-of-reference](http://www.gov.uk/government/news/independent-review-of-building-regulations-and-fire-safety-publication-of-terms-of-reference)

2018. Subject to the conclusions of that review, the Government intends to consult on adopting the technical changes to SAP outlined in this document as part of its consultation on making improvements to Building Regulations energy requirements in England where there are cost effective, affordable and safe opportunities to do so.

Adoption of these changes to SAP in Northern Ireland, Scotland and Wales is a devolved matter.

# Summary of consultation responses

The consultation presented 17 questions relating to specific proposals for changes to the methodology, and three questions requesting evidence on broader issues.

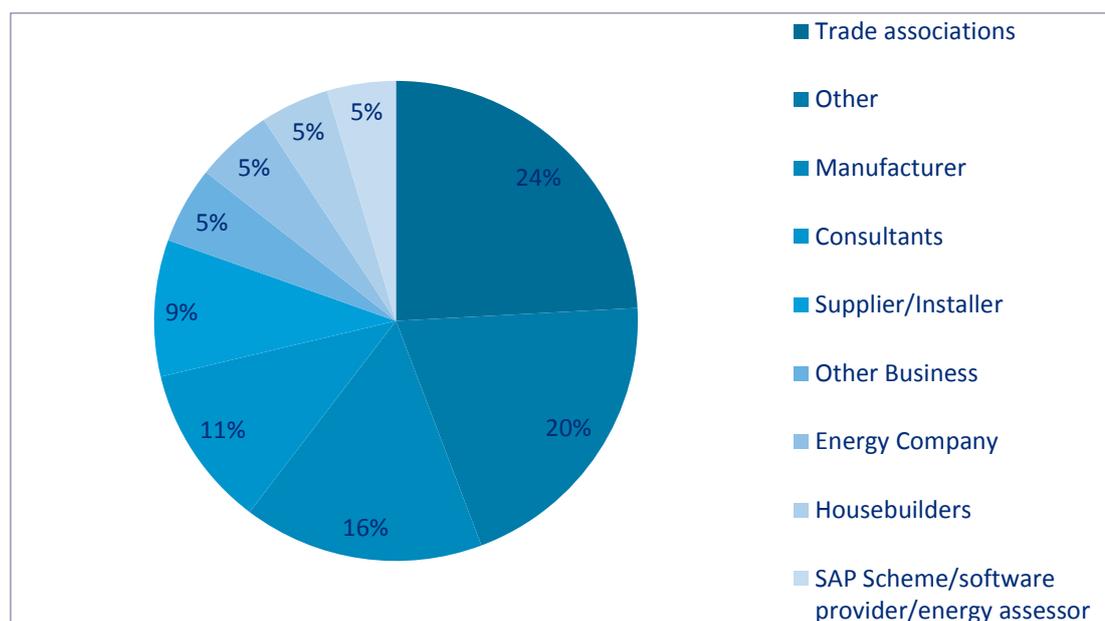
There were 176 unique responses from a range of interested groups. The response to each of the questions is considered separately below.

In general, respondents were broadly content with the proposals but many submitted detailed modifications to improve the accuracy of the methodology and mitigate any risk of negative impacts. Where challenges were raised to proposed changes they broadly fell into two conflicting categories:

1. The methodology lacks sufficient detail to effectively account for particular innovations or situations
2. The methodology suffers from an excess of detail, making it complicated or expensive to execute.

About 15% of responses made points that were unrelated to the questions in the consultation. Those points have been considered in Annex A at the back of the response.

Chart 1: Responses by sector



# Proposed Amendment 1 - Updating Carbon Emission Factors

## Consultation Question

- |    |  |
|----|--|
| 1. | Do you agree with the proposal to use the methodology set out in the technical working paper for calculating carbon emission factors and update the figures? |
|----|--|

80 respondents broadly supported the proposed changes. 25 opposed the changes, mainly for the following reasons:

- the emissions factor for biomass was incorrect (either too high or too low);
- the figure for electricity grid emissions factor was incorrect (either too high or too low);
- the period taken into consideration for calculating the electricity grid factor was too short, and the electricity grid factor should be revised annually; or
- the electricity grid factor should be calculated on a monthly basis rather than an annual basis.

There were several requests to update the figures in line with the methodology nearer to the time of adopting of new Building Regulations; and to calculate at that point the impact on gas Combined Heat and Power and solar photovoltaics. The Government will consider the case for using the marginal emissions factor.

As a result of these responses, we will adopt the methodological approach for calculating the emissions values for fuels as proposed in the consultation (with one change as below). However, we will seek to update the greenhouse gas emission factors and primary energy factors at the time of the next Building Regulations change, and assess the regulatory impact at that point. We have decided to keep the methodology for biomass in line with the consultation, given the proposed approach is consistent with the approach taken for greenhouse gas assessments, and the lack of agreement on a robust alternative submitted by respondents.

We are assessing the technical feasibility and impact of changing the carbon emission factor calculation to a monthly method from an annual method. This means the annual carbon emissions savings associated with technologies exporting electricity for example, will vary depending upon their monthly output. However, it does not mean that the target for new build properties will vary depending on the month of the year.

# Proposed Amendment 2 – SAP heating regime

## Consultation Question

- |    |  |
|----|--|
| 2. | Should we keep the current set of heating patterns set out in SAP or move to using two heating periods every day of the week? Please provide supporting information for your view. |
|----|--|

There were 43 responses in favour of moving to two comfort level periods, seven days a week, and 28 in favour of keeping the current assumptions on comfort levels.

The Government intends to move to a new set of heating patterns with two comfort level periods seven days a week in accordance with the majority view of respondents and to reflect the evidence presented through the Energy Follow-up Survey 2011.

Some responses recommended a 24 hour heating period, but the Government view is that this would not reflect typical heating patterns in the UK. Some respondents wanted longitudinal data before making a decision, however, all available data was provided alongside the consultation. Some respondents wanted a different heating pattern for new build and existing buildings with the reasoning being the typical differences in energy performance.

# Proposed Amendment 3 – Distribution loss factors for heat networks

## Consultation Question

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|----|--|
| 3. | Do you agree with the proposal to amend default Distribution Loss Factors for Heat Networks? |
|----|--|
- 

51 responses were in favour and 15 were against. Several issues were raised on this question. There were concerns regarding assessing whether compliance with the ADE/CIBSE<sup>2</sup> “*CP1: Heat Networks: Code of Practice for the UK*” had been achieved in practice. We are working with CIBSE and ADE to ensure certification evidence is available for the SAP assessor as-built assessment stage.

The Government will review the £120 standing charge on communal networks cited in SAP.

For SAP assessments (new-build), 15 responses queried:

- If the same default value should be used at design-stage and as-built stage. Our proposals featured a minimum limit of 1.2 at design-stage (and flexibility to manually enter any higher value) and 1.5 at as-built stage;
- Whether the in-use factor applied to calculated distribution loss factors entering the Products Characteristics database (PCDB) should be lower than 1.15.

For design-stage SAP assessments, we are minded to remove the minimum limit of 1.2.

For as-built SAP assessments, we are considering an additional in-use factor option for heat networks compliant with the “*CP1: Heat Networks: Code of Practice for the UK*” (to be applied to calculated distribution loss factors entering the PCDB).

For heat networks not entered in the PCDB, if these are compliant with the “*CP1: Heat Networks: Code of Practice for the UK*” then a default distribution loss factor of 1.5 will apply. If not compliant, a default loss factor of 2.0 will apply.

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<sup>2</sup> Association of Decentralised Energy/Chartered Institution of Building Services Engineers

There was also the issue of whether SAP could take the same approach as SBEM to consider future heat loads. The Government will gather further evidence and views on this proposal and consider whether any changes are required.

Some responses asked if we should link heat losses to the flow temperature for heat networks; and consider the impact of different occupancy levels on actual metered data compared to the modelled data. The Government believes these issues can be managed within the Product Characteristics database, where details of the heat networks' actual performance can be reflected.

# Proposed Amendment 4 – SAP’s lighting calculation including RdSAP

## Consultation Question

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|----|--|
| 4. | Do you agree with the proposal to change the way that lighting is calculated in SAP? |
|----|--|

There were 42 responses in favour of this proposal and 18 against. The Government concludes that it is reasonable to require some thought to be given to lighting design at the design stage of new build construction, and consequently is minded to proceed with this proposal.

The Government has reviewed the responses and agrees that it is not proportionate to adopt the proposed approach for existing houses. We will introduce it solely in respect of new build and only in respect of habitable rooms, and continue to use a similar set of inputs to the present method for existing homes. Responses indicate that where there is insufficient evidence to specify lighting requirements at design stage, this is due to current requirements on fittings, rather than new complexity arising from proposed changes to SAP.

# Proposed Amendment 5 – Treatment of thermal bridges

## Consultation Question

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|----|---|
| 5. | Do you agree with the proposal to remove the example values in Table K1 and recognise Certified Thermal Details and Products schemes? Do you agree with the proposal in due course to amend the default y-value to 0.2? |
|----|---|

There were 64 responses in favour of the proposals and four against. The Government has reviewed the responses and will take forward the approach set out in the technical working paper. However, we will remove the explicit reference to BRE accredited details as a number of schemes are now available.

Some responses provided further suggestions regarding the default y-value which is part of the approved document. These included having a number of default y-values that depend on particular characteristics, and having different defaults at design and as-built stage. The suggestions have been noted and will be reviewed again when a change to the approved documents is next proposed. Consultation proposing any changes in England to the guidance in Approved Document L will be after the independent review of building regulations and fire safety being led by Dame Judith Hackitt has concluded.

# Proposed Amendment 6 – Treatment of areas next to unheated spaces

## Consultation Question

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|----|---|
| 6. | Do you agree with the proposals to adjust U-values and $\Psi$ -values for elements next to unheated spaces? |
|----|---|
- 

There were 44 responses in favour of changes and 15 against. The main concerns raised were regarding the burden imposed on assessors with the psi value changes.

The Government intends to adopt the U-value changes but recognises that changes to psi-values will need to be reviewed to see if this process could be simplified for assessors. If it becomes clear that this changes is too burdensome for assessors, this part of the proposal will not be taken forward in the final version of SAP 10.

# Proposed Amendment 7 – U-Values for walls in existing dwellings – RdSAP

## Consultation Question

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|----|--|
| 7. | Do you agree with the proposal to change the default U-values for walls for existing buildings in RdSAP? |
|----|--|
- 

63 responses were in favour of the proposals and four against. Given the robust evidence for this update and the majority agreement, the Government intends to make these proposed changes to RdSAP in November 2017.

DCLG are planning to make similar changes to default wall U-values in the construction database supporting the Simplified Building Energy Model (SBEM) for non-domestic buildings.

# Proposed Amendment 8 – Hot Water methodology in SAP

## Consultation Question

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|----|---|
| 8. | Do you agree with the proposal to amend the hot water methodology in SAP? |
|----|---|

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There were 68 responses for the change and 16 against. The Government intends to go ahead with the changes, while accepting some concessions to address the following issues highlighted through the consultation.

The consultation proposed that entry of shower flow rate should only be possible if a flow restrictor is fitted. Responses suggested, and we agree, that it should be possible to enter the value used in the Part G assessment.

Responses were received suggesting different cold water temperatures should be used for systems with header tanks and those taking cold water directly from a mains feed. The Government plans to take this suggestion forward.

One response suggested that distribution pipework losses should be reduced where instantaneous electric showers are used since there will be none associated with showering. We think this is a sensible suggestion and intend to include this amendment, subject to any technical difficulties.

## Proposed Amendment 9 – Summer temperatures assessment (Appendix P)

### Consultation Question

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|----|---|
| 9. | Do you agree with the proposals to change the questions in the assessment of internal temperature in summer (Appendix P)? |
|----|---|
- 

48 responses were in favour and 22 against. The Government is minded to implement these proposals on what will now be referred to as the “heat gain check”.

The main feedback from those against is that changes should instead be incorporated into the building regulations to make assessment of overheating risk more robust. On this, DCLG is currently undertaking research into overheating in new homes. The outputs of this research will help to determine what further measures should be put in place, if necessary, by 2020. SAP Appendix P is likely to be reviewed again in the future in the context of this research.

The wording of the proposed questions and the guidance will be tightened to make more reference to passive ventilation systems, to clarify definitions of purge and boost ventilation, to define window “openability” more clearly, and to refer to CIBSE guidance on this issue.

# Proposed Amendment 10 – Mechanical Ventilation Systems

## Consultation Question

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|-----|---|
| 10. | Do you agree with the proposal to amend the treatment of Mechanical Ventilation Systems in SAP? |
|-----|---|
- 

There were 40 responses in favour and 15 responses against the proposals. In general, the proposals responded to issues arising during the installation of Mechanical Ventilation and Heat Recovery and decentralised Mechanical Extraction Ventilation. There were criticisms that Building Regulations – Approved document – Part F (Ventilation) would be better suited to discriminate alternate installation practices. These comments would need to be considered at the next Part F review, however, it is proper for Part L (and SAP) to address the energy consequences of bad installation practice, and so we are minded to adopt proposals as presented with one minor change. We will amend SAP Table 4h so that different efficiency in-use factors are applied when the system is installed “exclusively within heated envelope” or not. The previous draft stated “dwelling heated envelope”, which may be too prescriptive for cases in which the MVHR unit is installed within a communal heated corridor (for maintenance purposes).

# Proposed Amendment 11 – Chimneys

## Consultation Question

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|-----|---|
| 11. | Do you agree with the proposal to change the assumed air flow rate for chimneys and flues in SAP? |
|-----|---|

Out of 59 responses to this question, 41 supported proposals to change the assumed air flow rate for chimneys. Five responses were opposed to the proposal due to concerns that there may be a disadvantage to older properties in which traditional chimneys are more prevalent. Of the remaining 13 responses many showed overall support for the proposal, but certain challenges were raised. Several respondents queried the reliability of the evidence underpinning this proposal, in particular questioning whether the specifications assumed in technical working paper CONSP-15 accurately reflect modern high efficiency products. Questions were also raised concerning the flow rate for permanently blocked chimneys. The Government will review this matter while preparing SAP 10. At the same time we will also review whether it is appropriate to consider a chimney with damper as a full chimney, and provide justification.

# Proposed Amendment 12 – Secondary Fraction from Storage Heating

## Consultation Question

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|-----|--|
| 12. | Do you agree with the proposal not to alter assumptions on storage heating secondary fractions in SAP? |
|-----|--|
- 

There were 40 responses in favour and five against. As proposed, the Government intends not to alter assumptions on storage heating.

# Proposed Amendment 13 – Solid fuel heating efficiencies

## Consultation Question

13. Do you agree with the amendments proposed to solid fuel heating efficiencies?

41 responses agreed with the proposals to amend the default values for solid fuel heating efficiencies, with two against. The Government will adopt the proposals set out in the consultation. In summary these were to:

- revise the default SAP annual efficiency values for pellet fired stoves and boilers in the light of recent HETAS revisions and SAP test results;
- make the default solid fuel efficiency values in SAP consistent with other fuels so that the heat gain from the case loss is disregarded (as in the HETAS minimum efficiencies); and
- remove the distinction of being in a 'heated space' or 'unheated space' for independent boilers.

# Proposed Amendment 14 – Solar PV systems and overshadowing

## Consultation Question

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|-----|--|
| 14. | Do you agree with the proposal to amend the procedure for determining overshadowing of solar PV installations? |
|-----|--|
- 

There were 37 responses in favour of the proposals and 33 against. There was broad agreement that where Microgeneration Certification Scheme (MCS) data exists, the value of the shade factor can be utilised for SAP. However, many of those against the proposals judged the two stage overshadowing factor as too complicated for assessors, as they may need to access the roof of the building which wouldn't otherwise be necessary.

The Government will therefore allow the use of MCS certification data if available at as-built stage if available, but not adopt the proposal for a two-stage overshadowing factor.

# Proposed Amendment 15 – Treatment of Solar PV and solar thermal systems – diverters

## Consultation Question

|     |   |
|-----|---|
| 15. | Do you agree with the approach to adjust the carbon savings where solar photovoltaic (PV) electricity is used in the home to heat water or where it is put into battery or other storage? |
|-----|---|

On the specific proposals to provide a utilisation factor for solar PV being stored in a hot water tank, there were 48 responses in favour with 25 against. Most of those who were not in favour of the proposals cited a range of information to support a wider ranging recalculation of the treatment of the output from solar thermal and solar PV when used and stored onsite.

As a result of evidence provided:

- a) The Government will adopt the proposed factor of 0.9 for electricity exported to a hot water tank from solar PV. The percentage of electricity exported when there is solar PV with a diverter will be adjusted to assume that 80% of electricity is used onsite in the presence of a thermal store appropriately sized to provide space heating/meet all hot water needs in line with Appendix J. The value of electricity on export will be adjusted to reflect the greater benefit to the consumer of using their own electricity as opposed to exporting it. This value will be set in line with wholesale electricity prices and price projections from Annex M of the “Projections of greenhouse gas emissions and energy demand from 2016 to 2035.”
- b) The Government is minded to use the new European Standard EN15316-4-3 to provide a methodology for evaluating solar thermal for space heating purposes, in line with comments from the relevant trade associations.
- c) The Government is minded to assume, subject to additional data, that when solar PV is diverted to a battery, a significantly greater proportion of electricity will be used onsite, with other calculations consequent to that, as set out above.

# Proposed Amendment 16 – Boilers and seasonal efficiency in the Product Characteristics Database (PCDB) – including RdSAP

## Consultation Question

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|-----|---|
| 16. | Do you agree with the proposal to provide a series of seasonal efficiencies for boilers on the Product Characteristics Database dependent on the controls they use and the design flow temperature of the system? |
|-----|---|
- 

There were 32 responses in favour and 15 against. These proposals do not reflect a change for manufacturers in terms of database entry requirements; they reflect a change to the efficiency credit options awarded to space heating efficiency.

The Government is minded to go ahead with the proposals as set out.

## Proposed Amendment 17 – Heat pump default values

### Consultation Question

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|-----|--|
| 17. | Do you agree with the proposal to amend the default values for some heat pumps based on evidence from RHPP field trials? |
|-----|--|
- 

There were 44 responses in favour and ten against. Overall, these were in favour of the proposals as they were evidence based (these changes increase the default annual efficiency/SPF in certain cases). The Government is minded to introduce these proposals.

# Proposed Amendment 18 – Technology costs in RdSAP

## Consultation Question

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|-----|---|
| 18. | Do you have any evidence on the technology costs used in RdSAP? |
|-----|---|

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Some data on costs was received under the consultation and will be used to review the table of cost data of energy efficiency improvement measures, which is used for Energy Performance Certificates and Green Deal Assessments.

# Proposed Amendment 19 – Heating controls

## Consultation Question

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|-----|---|
| 19. | Do you have any evidence to update the assumptions that SAP makes about heating controls? |
|-----|---|

As a result of information provided, we will provide further scope for recognising the effects of different types of heating control, as far as practicable. It should be noted that there is not currently a broadly used formal definition for some of these control types. It is likely these will need to be developed within the SAP specification in future.

We will alter the methodology to reflect the latest research on Thermostatic Radiator Valves, if analysis of the data demonstrates that this is necessary.

# Cost to business

## Consultation Question

- |     |  |
|-----|--|
| 20. | Can you provide any evidence on the cost and benefits to business of revisions to SAP independent of changes to any particular set of Buildings Regulations? |
|-----|--|

Limited quantitative data was provided in response to this question. Some of the qualitative impacts of particular proposed changes were raised in response to other questions, such as those on lighting, solar PV overshadowing and psi values, where this has been used to assess the cost and benefit of proposals.

## Annex A – Other topics raised

### **Whether the metric used on Energy Performance Certificates should be changed.**

The Government will need to consider any changes in light of British and European requirements. It should be noted that the Energy Performance Certificates (EPCs) contain a wide range of information on the performance of the home. EPC methodology is subject to change to keep pace with new building materials and technology.

### **SAP cannot be used to design a dwelling.**

SAP should not be used to design a dwelling, particularly its heating system. It is used to check compliance with Part L of the Building Regulations (amongst other uses). There is a wide range of dwelling design software packages on the market which allow the user to design a dwelling and some include a SAP compliance check as well.

### **Like SBEM, SAP should allow for dynamic modelling for new build.**

The Government will keep this under review. It may be particularly helpful for some build types.

### **Enforcement is the real issue, not methodology**

Following the outcome of the independent review of Building Regulations and fire safety that is due to report in spring 2018, and subject to its conclusions, the Government will look at the potential for any further action on compliance and enforcement related to energy performance standards.

On EPCs, local weights and measures authorities (usually through their trading standards officers) are responsible for enforcing the regulations that require an EPC to be made available. DCLG monitors enforcement activity through regular reports compiled and submitted by these authorities. There should be a specific version of RdSAP for very old buildings.

We agree that the wide range of construction techniques and materials used to build pre-1919 dwellings and the lack of large datasets on their performance makes this area challenging. We have made some adjustments to Appendices S and T to reflect this, such as new u-values for solid walls.

### **Solar gain assumptions in SAP are incorrect**

We will work with industry and DCLG in the context of the research they are currently undertaking into overheating in new homes to review solar gain assumptions in SAP. This may be both in terms of solar radiance and in terms of assumptions around use of blinds and shutters. This research is unlikely to be available to update SAP 10 but may inform other proposals.

### **Promote wood stoves as a recommendation on EPCs.**

If we are correct to assume that in most cases wood stoves are secondary heating, then the rate of use is such that it is unlikely to be a cost effective recommendation. While we are

aware of wood stoves being used as the primary heating source, the circumstances where this would effectively meet the SAP assumptions on heating demand are very limited. In addition, there are concerns about the impact such heating has on local air quality.

**SAP is not good on innovative building types.**

We will review whether SBEM is better placed to review certain types of mixed use innovative building over a certain size.

**SAP does not include embedded carbon in products.**

This is true because of the added complication it would add to the model; and to align with requirements under Annex I of the Energy Performance of Buildings Directive.

**Entering insulation values for room-in-roof should be reviewed.**

We acknowledge that it would be worthwhile to review these. The options for allowing U-values to be assigned for each construction element independently will be reviewed for SAP 10.

**Listing on the Products Characteristics Database should be mandatory for all products.**

The database is a voluntary industry/Government initiative to allow product performance data to be held in a public database for use in SAP assessments. For this, there needs to be an agreed standard approach for testing energy performance and with which accredited laboratories can provide test data. Not all products can be recognised by SAP, and in cases where they can a test and annual performance calculation method may not exist. We encourage trade associations and others to approach the Government and its contractors where it is keen to utilise existing test and annual performance calculation methods or establish new ones. Where such a method exists, and listing in the database is consequently possible, its use is encouraged by setting SAP default annual performance values at the lower-end of the observed performance scale (from field trials). It would be impracticable and unnecessary to enforce a mandatory requirement.

