

STAKEHOLDER RESPONSES NOTE

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Responses to comments and recommendations assembled by stakeholder groups (Micro-generation industry, Zero Carbon Hub and Heating and Hot Water Industry Council).

Date last amended	19 December 2011
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Introduction

This note gathers together comments and recommendations that have been made by three stakeholder groups (the micro-generation industry, the Zero Carbon Hub and the Heating and Hot Water Industry Council) regarding the development of SAP.

The note separately presents the three sets of comments, retaining the individual formats in which they were received, and with responses inserted where appropriate. The responses are necessarily quite brief in most cases. They are mostly intended to address issues in general rather than focusing on responding to every single point that has been made.

COMMENTS FROM THE MICRO-GENERATION INDUSTRY

Microgeneration Government Industry Contact Group: Task Group 2

SAP Snag List – as updated following Task Group 2 meeting, August 2011

Introduction

Whilst MCS accreditation will provide assurance that the performance of a microgeneration product is up to standard, the MCS performance figures will be inputted into the SAP calculation. SAP, with MCS as its performance component, will have a key role to play in terms of assessing 'energy in' versus 'energy out'. SAP is not a design tool but is an integral part of house and system design and will therefore have an important influence on the role microgeneration plays in key policies and measures, including the Green Deal.

REMARK: Data provided for MCS purposes is generally based on a single test condition to establish and compare its performance with the stated minimum performance criteria. SAP, on the other hand, needs to know how the product performs over the expected range of operational duties. It is therefore interested in the performance curve for the product, and whether the product is above or below the minimum performance criteria set by the MCS is insufficient. It is, therefore, highly unlikely that data provided for MCS purposes could be used as an input to the SAP.

Below is the current list of SAP 'snags' for microgeneration technologies as discussed by the group. Where a potential recommendation was discussed, this has been listed also.

Underestimation of heat pump COPs

Problem:

Different under floor heating system coverings deliver different reaction times and default values for radiator flow temperatures will rarely affect the optimum efficiency for any one property. Wood coverings are currently treated as the best option in SAP even though the insulating effect of wood actually delivers lower Coefficients of Performance than other alternative floor coverings. For instance, concrete covering allows for more effective distribution of low temperatures and therefore better Coefficients of Performance. Furthermore, SAP does not allow the benefits of various different permutations to be accurately represented e.g. SAP does not currently allow for under floor heating downstairs and radiators upstairs, preventing the highest level of efficiency from being achieved in some cases.

Recommendation:

It should be possible to input customised radiator flow temperatures to match the property in question. This could enable SAP to reflect the manufacturer's recommendations and would enable the customer to see real energy savings.

RESPONSE: Whilst such a recommendation might be implementable in principle, it would be difficult to deliver in practice. Such a scheme would need to be based on a certification system to provide evidence that the heat emission system had been designed and installed in accordance with agreed procedures and that the flow temperature is at the manufacturer's recommendation. SAP would need to know how products performed at different flow temperatures and reacted to operational variables, such as the variation of water temperature with weather conditions (depending on the control system adopted). This is likely to mean manufacturers undertaking additional testing,

outside the parameters set in European Norms. A significant amount of investment would therefore be needed to take this issue forward, so manufacturers must be sure the benefits of using different flow temperatures, which has to be proven, justify that investment cost. Assuming this could be worked up for new dwellings, where there is a reasonable chance that the evidence may be provided to the SAP assessor, it is unlikely to be a workable arrangement for existing building assessments. Here the assessor will simply have to rely on default assumption for flow temperatures. This recommendation could be considered for next SAP revision but this would need significant input and investment by industry interests.

It has been highlighted by group members that the [Heat Emitter Guide for Domestic Heat Pumps](#), produced by a group of trade bodies and supported by DECC and EST, could provide a useful model for making SAP more flexible with regard to flow temperatures and flooring materials so as to optimise overall performance.

REMARK: The Heat Emitter Guide is not a design procedure, and so is not sufficient on its own to ensure that emitters are large enough to enable the heating system to run at a consistently lower temperature.

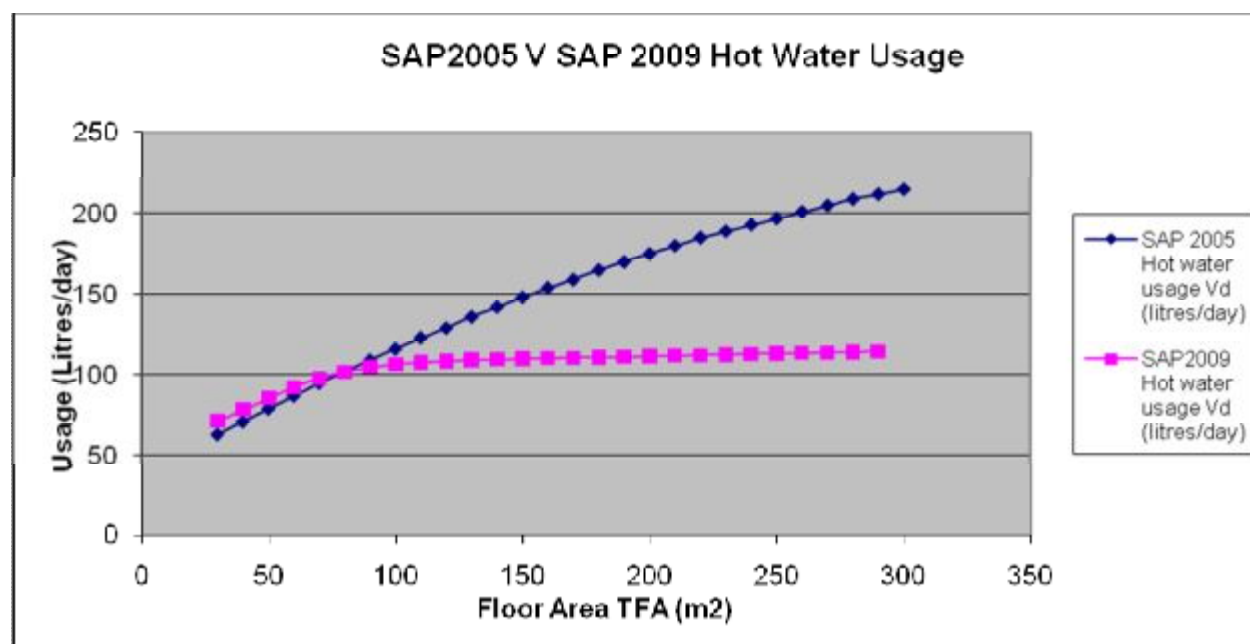
Misrepresentation of solar thermal performance

Problem:

This concern stems from an issue identified using SAP 2005: it was highlighted by a number of industry participants that the SAP output for solar thermal installations deviated from the actual performance (measured using TSol, for example) to an increasing extent with the size of the installation. So, as a general rule, the greater the capacity of the domestic solar thermal installation, the greater the deviation of the measured performance using SAP from the performance using other types of established energy assessment software. The industry view is that this is because SAP is not a polynomial fit for solar thermal. It was thought that SAP 2009 would rectify this problem but, in reality, it has introduced new complexities.

The reason for this is thought to be that, under SAP 2009, domestic hot water per person per day has been capped (Part G compliance) compared to the domestic hot water usage assumptions under SAP 2005. This results in the hot water tank for a given property being undersized (once a certain demand threshold has been exceeded) in relation to the actual hot water demand of the property which leads to the installer over sizing the hot water tank in relation to SAP values. This risks negating any efficiency gains from the installation of a solar thermal system and therefore removes the apparent benefits of installing the technology.

RESPONSE: SAP has no procedure for sizing a hot water tank or for sizing a solar installation. That should be done according to the requirements of the property. Hot water usage varies greatly from one property to another of similar size. SAP is based on typical data.



There are also some other factors affecting solar thermal performance in SAP: the solar yield is now monthly not annual and collection performance factors are different in SAP 2009. This means that the representation of solar thermal performance in SAP 2005 and SAP 2009 is now often quite different, with SAP 2009 now indicating lower energy output than SAP 2005 when other variables

have remained constant, e.g. for the same installation, SAP 2005 showed the solar contribution to domestic hot water as 1,535 kWh whereas SAP 2009 showed it as 1,125 kWh.

RESPONSE: EST has recently published a report on field trials of domestic solar water heating, which will be examined as part of a review of solar water heating for next SAP revision.

If we factor in that the apparent benefits are already being diluted due to the hot water tank being oversized relative to SAP, this can have a significant impact on the perceived benefits of the technology in relation to its actual benefits.

Other remaining issues

Micro CHP: There is a lengthy and expensive testing procedure for micro CHP and an alternative is needed.

REMARK: the PAS67 test procedure for heat-led micro CHP units was developed in full consultation with industry. There was general agreement that the testing regime was appropriate to determine the performance curve for micro CHP units, which are more complex than boilers. The PAS has subsequently been reviewed with a view to reducing the costs of testing.

RESPONSE: Micro CHP is complex and must be tested appropriately, otherwise insufficient data may result in an underperformance being recorded, particularly given the variety of possible technologies and large differences in design and control options (affecting, inter alia, the power to heat ratio under various loading conditions).

Direct solar thermal systems: A thermal store diagram needs to be inserted into SAP so that it reflects the current range of types of system available.

Fuel cost elements: Is a fuel cost element in SAP still appropriate when prices are so volatile?

RESPONSE: Yes, some policy initiatives such as Green Deal are based on fuel costs. The fuel prices used in SAP are based on a 3-year running average, which removes most of the price volatility.

Potential contribution of secondary heating systems: There is a restriction within SAP that secondary heating systems can only provide up to 10% of the space heating load in a property. The point has been raised that some secondary systems (e.g. wood-burning stoves) can supply more than this limit, particularly in better insulated properties. Although installed in one room only without warm air distribution, the system would provide enough heat for a number of adjacent rooms (with doors opened) or open-plan living areas. Increasing the limit could strengthen the case for solid fuel heating appliances, particularly in rural areas off the gas grid where wood is readily available and thus the economics stack up compared with LPG or heating oil.

REMARK: whilst the secondary heating assumption is broadly based on typical performance there has to be a specified level, otherwise there is no basis for comparing the performance of dwellings. SAP has to assume the secondary heating system can provide the specified level of heat. It matters not whether the system employed can perform better this.

RESPONSE: Evidence would be needed to support a change from the present 10% assumption.

COMMENTS ASSEMBLED BY THE ZERO CARBON HUB

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	Comments
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>	<p>Some adjustments to treatment of boilers have been made (see STP11/09). The position will be reviewed for the next SAP revision, including issues for heating controls</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>	<p>Heating controls are specified in the Domestic Building Services Compliance Guide.</p> <p>The ability to compare the performance of dwellings is predicated on the elimination of behavioural variables outside those set to enable a comparison of performance. Controls that facilitate behaviour change cannot be assessed in SAP as the impact of the change in behaviour cannot be predicted, so there is no comparative base. Such controls could also therefore facilitate an increase in energy consumption.</p> <p>There are no plans to update the occupancy profiles.</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>	<p>This was reviewed for SAP 2009. Further review is not planned.</p>

Area	Responses	Comments
Heating regime	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>	SAP has a standard regime for consistency of application. An option would lead to inconsistencies depending on whether it was selected or not.
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. <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>	<p>Has been discussed with AECOM, no changes planned.</p> <p>Room-sealed appliances are accommodated in SAP. We are not aware of any tests. Please supply details.</p>
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>	<p>Table K1 has been revised to include additional junctions.</p> <p>Agree this would be helpful (being considered separately from SAP).</p> <p>Conventions have been reviewed and additional guidance about this added. They will be further reviewed before implementation of SAP 2012.</p>

Area	Responses	Comments
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>	<p>Overheating model will be reviewed for next SAP revision. However, there is a concern that the outputs of the current overheating model are being ignored by designers. So whilst the providing information to minimise the impact of summer overheating is important consideration has to be given to the resourcing of an improved model. If there are no changes to the regulatory regime to set criteria for summer overheating then a revised model could simply become an expensive white elephant.</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>	<p>Space cooling is considered in SAP if a system is installed.</p>
Secondary heating	<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> <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>There is a question as to whether the anecdotal and survey evidence is robust; in particular whether gas fires as heating appliances have been separated from decorative gas fires. The figure of 10% is intended to represent typical usage across the whole housing stock, and across the numerous permutations of main and secondary heating types. Would need to see statistically significant evidence to support a change from the current 10% assumption.</p>

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	Where an appliance has a dedicated external air supply, we would recommend the requirement for a flue be removed from SAP. <i>[HETAS]</i>	This is already the case.
Lighting	Account for LED lighting <i>[Lighting Association]</i>	To be reviewed for next SAP revision.
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>	Window characteristics can vary considerably. Table 6e provides default values and actual data can be used where performance information is available via a recognised and reliable source (e.g. BFRC). A database for windows will be considered for next SAP revision.
Ductwork	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>	Consideration will be given to this being a topic to be reviewed for the next SAP revision.
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>	SAP uses typical occupancy based on floor area (derived from data on 32,000 dwellings). This is not a figure for design purposes.

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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>	<p>This issue is being addressed.</p> <p>To be reviewed for next SAP revision.</p> <p>SAP takes account of the cylinder characteristics for heat pump with measured data.</p> <p>To be reviewed for next SAP revision.</p> <p>Data from phase 2 of the EST field trials will be factored into next SAP revision. Data from phase 1 forms part of the SAP consultation.</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>	<p>At present the procedure is for heat-led devices. There are other scenarios that could be evaluated, initially this would be via Appendix Q.</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>	<p>Second order coefficients are now included. Other aspects to be reviewed in the next SAP revision.</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>	<p>Treatment cannot be refined further without specific system data. The establishment of a database of community heating system characteristics (configuration and performance) has been proposed. Treatment of LZCT can be reviewed if evidence becomes available.</p>
Controls	<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. <i>[BEAMA]</i></p> <p>New technologies (currently available): <i>[TACMA & BEAMA]</i></p> <p>SAP needs to recognise some of the technologies being developed; areas that should gain</p>	<p>Evidence will be needed to establish the energy savings attributable to heating controls. Two recent field studies have shown that, contrary to expectations, controls did not save energy. This casts doubt upon models which suggested they did, and to move forward a suitable methodology must now be found that will provide credible results; probably using a combination of experimental and</p>

Area	Responses	Comments
	<p>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): <i>[TACMA & BEAMA]</i></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 	<p>analytical techniques.</p> <p>When energy savings are found then definitions can be developed to describe accurately certain types of control. Definitions need to be sufficiently rigorous to ensure that the critical features are present in particular products, and work in the way that is supported by the evidence. This can be handled through SAP Appendix Q and the Product Characteristics Database.</p> <p>It is proposed that zone control using wireless TRVs should be recognised in SAP 2012, as an alternative to circuit switching.</p> <p>Ecodesign regulations are likely to adopt a different approach to evaluation and will not necessarily be compatible with principles of SAP, most notably in regard to the use of building data.</p> <p>To introduce credit for controls without reasonably convincing evidence would encourage their adoption under assumptions that may prove to be false. That would lead to incorrect assessments of the energy performance of buildings and the contribution to climate change objectives.</p> <p>Research is needed to provide data on issues related to smart grid technologies. The model cannot be developed without such data.</p>

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	<p>overall load management.</p> <ul style="list-style-type: none"> • 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 measures the benefits of sophisticated technologies and design approaches and a full dynamic model should be considered.</p> <p>Basic weaknesses in current methodology: <i>[TACMA & BEAMA]</i></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. • 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: <i>[BEAMA]</i></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: <i>[BEAMA]</i></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>There is no basis for making a distinction.</p> <p>Room-by-room is not easily represented in the SAP model. Some investigation would be needed to establish the significance.</p> <p>Responsiveness is related to the mass that is being heated.</p> <p>This is indeed an old system and is included in SAP only for such old systems. It would not be applicable to modern systems. Tiled floors with the heating elements immediately below are treated the same as wood floors.</p>
Appendix Q	<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</p>	<p>In general the test methods for new products do not yet exist and have to be developed. They have to be designed carefully to show performance fairly and impartially.</p>

Area	Responses	Comments
	<p>appearance with the Appendix Q route. This needs to be simplified and a quicker route to SAP established, whether this be through another UKAS accredited testing body or even Universities. <i>[House builder]</i></p>	<p>Consideration then has to be given to the benefits that would be achievable under typical installed conditions in the housing stock of the UK.</p> <p>To introduce credit for new products without reasonably convincing evidence would encourage their adoption under assumptions that may prove to be false. That would be detrimental to alternative energy saving measures of proven value that might otherwise have been installed, and would lead to incorrect assessments of the energy performance of buildings and the contribution to climate change objectives.</p>
General / Other	<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</i> to be <i>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</p>	<p>Agreed, but this is the responsibility of the designer.</p>

Area	Responses	Comments
	<p>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> <p>Include daylighting calculation <i>[HBA/HBF]</i></p> <p>Facilitate industry involvement to develop software applications to suit needs. <i>[HBA/HBF]</i></p> <p>Implement all recommendations in Zero Carbon Hub Carbon Compliance for Tomorrow's New Homes Report as a matter of urgency. <i>[AECB/Passivhaus Trust]</i></p>	<p>Something to consider when smart meters become prevalent.</p> <p>To be reviewed for next SAP revision</p>
EPC Accreditation Schemes	<p>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.</p> <p>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 L 2010 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</p>	<p>Agree in principle. The possibilities for further database items will be kept under review</p>

Area	Responses	Comments
	<p>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.</p>	

COMMENTS FROM THE HEATING AND HOT WATER INDUSTRY COUNCIL



HHIC SAP 2009 Requested changes for 2013

This paper is being submitted for consideration by BRE as part of the review of SAP for the 2012 edition.

The following table has been produced from input provided by our members and we believe reflect the best interests of the industry as a whole.

Product	Section & Clause	Issue	Proposal	Comment																																																																		
Gas Fires	Secondary heating	The figure of 10% is felt to be too low based on anecdotal evidence the as fire industry has. HHIC decided to improve this understanding and conduct an online survey which had close to 300 responses.	<table><tr><th colspan="3">6. (Typical) Daily main heat usage when on</th></tr><tr><td></td><td></td><td></td></tr><tr><td>Not Used</td><td>1</td><td>0%</td></tr><tr><td>1 hr</td><td>3</td><td>1%</td></tr><tr><td>2 hrs</td><td>10</td><td>3%</td></tr><tr><td>3 hrs</td><td>27</td><td>8%</td></tr><tr><td>4 hrs</td><td>43</td><td>13%</td></tr><tr><td>5 hrs</td><td>57</td><td>18%</td></tr><tr><td>6 hrs</td><td>70</td><td>22%</td></tr><tr><td>7 hrs</td><td>44</td><td>14%</td></tr><tr><td>Over 8 hrs</td><td>74</td><td>23%</td></tr></table> <table><tr><th colspan="3">9. (Typical) Daily additional heat usage when on</th></tr><tr><td></td><td></td><td></td></tr><tr><td>Not used</td><td>21</td><td>6%</td></tr><tr><td>1 hr</td><td>54</td><td>17%</td></tr><tr><td>2 hrs</td><td>121</td><td>37%</td></tr><tr><td>3 hrs</td><td>55</td><td>17%</td></tr><tr><td>4 hrs</td><td>39</td><td>12%</td></tr><tr><td>5 hrs</td><td>13</td><td>4%</td></tr><tr><td>6 hrs</td><td>14</td><td>4%</td></tr><tr><td>7 hrs</td><td>4</td><td>1%</td></tr><tr><td>Over 8 hrs</td><td>8</td><td>2%</td></tr></table> <p>Looking at the figures above,</p>	6. (Typical) Daily main heat usage when on						Not Used	1	0%	1 hr	3	1%	2 hrs	10	3%	3 hrs	27	8%	4 hrs	43	13%	5 hrs	57	18%	6 hrs	70	22%	7 hrs	44	14%	Over 8 hrs	74	23%	9. (Typical) Daily additional heat usage when on						Not used	21	6%	1 hr	54	17%	2 hrs	121	37%	3 hrs	55	17%	4 hrs	39	12%	5 hrs	13	4%	6 hrs	14	4%	7 hrs	4	1%	Over 8 hrs	8	2%	There is a question about whether the anecdotal and survey evidence is robust; in particular whether gas fires as heating appliances have been separated from decorative gas fires. The figure of 10% is intended to represent typical usage across the whole housing stock, and across the numerous permutations of main and secondary heating types. Would need to see statistically significant evidence to support a change from the current 10% assumption.
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			HHIC have concluded that the average gas fire usage per day is about 2 hours and the figure for central heating is circa 7 hours. This gives an average of between 24.2% and 28.6%.	
μCHP	Appendix N – N1.1	Second sentence, first paragraph. May disadvantage DHW generation.	Should make reference performance averaged over 24 hours to cover DHW	At present the procedure is for heat-led devices. There are other scenarios that could be evaluated, initially this would be via Appendix Q.
	Table N1	<p>The bottom line refers to Hot water vessel volume heat transfer area. It is not clear what this means and cannot see where it is used.</p> <p>HHIC believes this could be more readable for the specifier as it seems more geared to a software developer</p>	Clarification needed.	The text has been amended to clarify that it is the heat transfer area of the heat exchanger.
	Table N2	<p>Second box refers to effect of weather comp and we believe this only applies to heat pumps</p> <p>The third box refers to the central heating circulator which is external to the package on mCHP</p> <p>Boxes 5, 7 and 12 refer to 'if negative' and we believe this should read 'negative if'.</p> <p>HHIC are concerned that the</p>	<p>Clarification needed</p> <p>Clarification needed</p> <p>Revised wording.</p>	<p>The text has been amended.</p> <p>This is whether the electricity used for the pump has been included in the test results (as indicated on the PAS-67 test certificate).</p> <p>No, it is correct as it stands.</p> <p>PAS-67 gives flexibility to test with any</p>

		optimum flow and return temperatures. Is it possible to give guidelines for the use of weather compensation, TRVs etc?		chosen distribution temperatures and any control method. Assumptions about the effect weather compensators have on boiler systems do not apply. TRVs should still be recognised for their ability to limit temperatures in individual rooms.
	N3.1	It is not obvious what E_{SP} , E_{SUM} , N_{SUM} and N_{HS} plus others are.	A full list of definitions would be very useful at the front of the document.	Agreed
	N3.2	It is not clear how this section is bring used and what it is trying to achieve. HHIC does not fully understand the variables being used. This is considered to be a major problem by our members.	Greater explanation would be useful. Explanations would be needed in the document.	Text revised. Explanations added.
	N4.2	Manufacturers need more explanation to aid product development.	More explanation as per N2	The SAP specification provides the information needed to make the calculations. Technical details of the methodology are documented in the description of the Annual Performance Method.
	General comments	As the calculation ignores the effects of other appliances, it could mean that it is perceived that more is being exported than is actually the case.	Appliances to be recognised.	Not sure that this is a significant issue. Micro-CHP is generally arranged such that the micro-CHP engine will run most of the time with the rest of the heat requirement met by another burner acting in effect like a boiler. The use of other heating appliances would not then much affect the micro-CHP.