

## **Minutes of the meeting of the SAP Scientific Integrity Group 19<sup>th</sup> September 2014.**

### Attendees

#### **SAPSIG members:**

Robert Lowe (RL) [Group chair]

Martin Searle (MS)

Neil Cutland (NC)

Tassos Kougonis (TK) [standing in for Tessa Hurstwyn]

Malcolm Bell (MB)

Apologies for absence - John Counsell

#### **DECC:**

Alan Christie (AC)

#### **BRE:**

John Henderson (JH)

Will Griffiths (WG)

Bruce Young (BY)

Les Shorrocks (LS)

Apologies for absence – Brian Anderson

***The purpose of this meeting was for SAPSIG members to debate a number of SAP development issues ahead of a wider stakeholder meeting later in the day. The briefing note for both meetings is appended to these minutes.***

### Introductory presentation

LS gave a short presentation covering the background to the meeting, intended to remind attendees of the six issues for debate which were contained in the briefing note that had already been circulated. The group's (anonymised) discussions on these six topics are summarised below (in the order in which they were presented in the briefing note rather than in the order in which they were discussed).

### Relationship between Appendix Q and RdSAP

The question here was how new technologies could be included in RdSAP more frequently given the more regular updating of this that was now being proposed.

There is currently a three year period between updating of the Product Characteristics Database (PCDB) to include new products, this being linked to the Building Regulations changes and the corresponding updates to the full SAP calculation. It was clarified to SAPSIG members that the PCDB is routinely updated every month but updates to include entirely new products require structural changes to the database - and the software needs to

then be adapted to read the new structure. Thus, new products have to be dealt with via SAP Appendix Q which provides a mechanism for including savings from products that cannot yet be dealt with via the PCDB.

This suggested that there was perhaps a need to think about inventing a new structure that could accept new products in such a way that the software could read in the relevant figures. However, it was clarified that there are actually relatively small numbers of new products that are put forward for inclusion via Appendix Q (typically only three in a three year period).

Given this, it was suggested that such relatively rare cases could perhaps be assessed using full SAP and the adjunct Appendix Q calculation rather than using RdSAP. Then there would be no urgency for more regular updating of RdSAP. The problem, however, was one of cost. RdSAP assessments are designed to be quick and relatively low cost – full SAP assessments are more involved and more costly. It was then suggested that maybe the process for using full SAP could be made easier and this would solve the problem?

**The group did not reach any conclusions on this topic but agreed that it should be discussed in the afternoon meeting with wider stakeholder groups.**

#### Faster Appendix Q2 process for low risk products

The question here was whether an alternative SAP 'Appendix Q2' application process should be adopted allowing new technologies to be recognised in SAP using a simple and quick assessment method.

In effect, this was just a less rigorous process, with large "in-use" factors applied for safety, but otherwise it was very similar to the existing Appendix Q process, involving similar steps.

SAPSIG members felt that since this was a more "lax" process it inevitably impacted on scientific integrity and so was a matter of concern to the group. The SAPSIG the view was that this was otherwise really no different to the existing SAP Appendix Q. It was noted that SAPSIG had a role to support BRE/DECC when we come across products that will be difficult to address.

**The group's recommendation was that we should not attempt to further shortcut the existing SAP Appendix Q process. As has happened in the past, BRE should prepare technical papers on such difficult products and submit them to SAPSIG for vetting and for the group's recommendation.**

#### "De minimis" provisions in Appendix Q

Introduction of a 'de minimis' level of energy savings has been proposed. Under such arrangements, recognition of new technologies within SAP would either go through a still simpler Appendix Q process or else be rejected entirely for inclusion in SAP/RdSAP if potential savings were below an agreed threshold. Assuming that this was thought to be sensible, the first question is how should that level be defined?

It was noted that a possible general 'de minimis' rule was mooted in the past (but was never formally implemented) whereby if a measure cannot improve the SAP rating by at least one point then it should not be considered (this raises questions about position on the SAP scale, which is non-linear, and also what to do about combining measures that individually might "fail" the test but taken together they "pass").

However, DECC ministers have since said (largely in relation to the Green Deal) that any measures should be allowed and so there should be no 'de minimis' level applied.

Arguments against introducing a 'de minimis' level were discussed and included:

- How do you verify something that has "a very low signal"? (this implies requiring very large sample sizes, which would usually be impractical)
- Assessors have to be able to identify the measure, which will often be difficult and perhaps impossible
- Assessors will need extra training to be able to deal with all the new measures
- The cost of assessments would inevitably have to be increased because of the added complications noted above

It was suggested that there is maybe no need for a 'de minimis' level since it is hard to make a business case for something that actually makes a negligible difference. In such circumstances the market would decide whether the product in question was viable – so it was suggested that it perhaps should just be left to the market.

Possible ways of defining the 'de minimis' level were discussed. It was suggested that it would be best not to do it in terms of SAP points because of the non-linearity of the scale - so a change of one SAP point actually has no unequivocal meaning. There was also a suggestion that it could perhaps be done via SAP Appendix Q reflecting the uncertainty in a savings estimate (i.e. a statistical approach might be employed). The problem with this, as already noted, is that it implies very large sample sizes and so it is impractical. This indicates that assessing the viability of a new product usually has to be done analytically. This is effectively what already happens via the feasibility study that forms a part of the SAP Appendix Q process.

Related to the above, there was also discussion of the need for conservative estimates for new products and hence the introduction of reduction factors (in-use factors). It was noted that benchmarks ought to represent best estimates rather than conservative estimates so any reduction factors applied really should depend on the circumstances (i.e. there would ideally need to be the ability to turn on and off any conservative assumptions) – although this obviously has the potential to lead to confusion. Whatever was done, it clearly needed to be completely transparent to avoid any such problems.

**The SAPSIG consensus regarding the question of whether there should be a 'de minimis' level was that, in the absence of a clear view of how it should be defined, there should not.**

It was agreed that SAPSIG could perhaps re-visit this issue later, at least insofar as scientific issues were concerned, but it was noted that Green Deal could also set its own rules about

whether it was prepared to accept new measures – i.e. certain measures could be allowed by policies but they would not be reflected in SAP.

#### Publicly available “live” working version of SAP software between official versions?

The discussion regarding developing a core calculation engine (see later) had concluded that this seemed to be a good idea. It was felt that this could also be made publicly available.

However, any “live” working version (or “development” version) would need to be restricted to academia/industry since a wider availability could lead to loss of control as well as potential confusion.

**It was agreed to defer further discussion of software providing a “development” version of SAP (“developable” was suggested as a better term) to a future meeting. There were several dangers with introducing such a version and it would need to be carefully controlled.**

The discussions on software also led into discussion of the SAP specification document. It was recognised that the current worksheet would no longer be needed (it was now effectively impossible to undertake a calculation by hand anyway) and that some other form of specification would be more appropriate going forward. A document that simply lists the relevant equations would be more suitable (and the recent BREDEM 2012 specification provides a possible template for this), but with other supporting documents that explain the underlying assumptions also being made available (similar to the documents that have been produced for SAP consultations).

#### Issues of liability

Liability was discussed mainly in terms of the Product Characteristics Database (PCDB) as this was probably where any errors or changes to entries were most likely to arise (and to be challenged by manufacturers, potentially leading to legal action).

It was pointed out that this was not a scientific issue and therefore it could be seen as being entirely outside SAPSIG’s remit. SAPSIG could therefore choose to take no view on it. On the other hand, checking of figures in the PCDB is important (i.e. ensuring that sufficient self-checking of figures was in place) and was a “reasonably scientific” activity.

It was noted that any problems with data entries in the PCDB could, in principle, be solved by the process – i.e. requiring manufacturers that have provided data to verify that what has been entered is correct and sign it off. This would at least guard against any simple transcription errors. The problem, however, is that the data supplied often has to be processed to produce what ultimately goes into the PCDB – and manufacturers would find it difficult to check in such circumstances – even if the database was fully “human readable”.

It was also noted that the risk associated with errors (and there will always be some errors) is something that simply has to be accepted and covered by appropriate liability insurance.

In this regard, concern was expressed about ensuring that liability issues not be allowed to constrain the scientific integrity of SAP.

**The general consensus was that it was not SAPSIG's role to look at such liability issues and therefore they should take no view on it (and, consequently, it should not be discussed in the afternoon meeting with wider stakeholder groups).**

#### Move to a fixed core calculation engine for SAP

The issue here was whether introducing a core calculation engine would be sensible given that commercial software suppliers are producing their own implementations, and that this is potentially leading to some inconsistencies between implementations.

This immediately raised the question from one member of why commercial software companies were involved at all. It was explained that this was largely for historical reasons and that it actually provides a "peer review" mechanism involving software suppliers checking the SAP specification, which is beneficial. If there was core software, this peer review mechanism would cease.

The view was expressed that programmers enjoy designing interfaces that run quickly and efficiently but they do not generally like dealing with the equations. Thus, it was suggested that software suppliers might actually welcome a core calculation engine as this would simplify their work allowing them to still compete on their interface, software cost and lodgement process.

**There was general consensus that a core calculation engine would be a good development but the scope of this would need to be precisely defined.**

It was noted that SBEM had gone down this route and that it worked well.

There was a suggestion that industry might be willing to fund the core development via some form of voluntary contribution (a direct levy was thought less likely to be accepted). It was also suggested that current software providers might be able to make a business case for contributing to a core calculation engine since it would reduce their development costs.

Such software would ideally need to be open source (again, SBEM provided a possible template for what could be made available). An open source core calculation engine has the advantage that it supports the peer review process and it also allows those that may wish to experiment to do so.

A suitable platform for writing the software would also need to be chosen. Consultation with industry on this was suggested but it was also suggested that the specific programming language does not matter and any structured language would be acceptable. Regardless of the platform used for the software, it was suggested that realistically it would simply be made available online rather than as a standalone piece of software.

**A couple of short papers were requested for the next meeting setting out the arguments for and against developing a core engine. BRE could prepare one of these and NES (represented at the following stakeholder meeting) would be invited to contribute one as well.**

**ACTION: BRE to prepare a short paper setting out the arguments for and against developing a core engine.**

**ACTION: NES also to be invited during the afternoon meeting to prepare a paper setting out the arguments for and against developing a core engine.**

#### Any other business

RL informed members that he was resigning as the group chairman.

In doing so, he highlighted that SAPSIG needed to consider recruiting more members to provide perspectives that are currently absent. In particular, since the resignation of John Tebbit, there was a need to recapture the construction products perspective. He also suggested new members from QA organisations / test houses such as BBA and CIBSE.

One area of SAP that he also highlighted as a particular problem was CHP / district heating. This represented a major growth area but there were at present large discrepancies between SAP and reality (which are being looked into, but this is a matter of some urgency).

The members expressed their thanks to RL for all of his work in the role of group chairman.

# Briefing note for the meeting (circulated in advance)

## SAP Development Debate

### Background

The National Calculation Method for energy rating of dwellings (SAP) is an assessment tool that has an important role to play in the delivery of several Government policy initiatives. These roles include:

- Building Regulations for England and the Devolved Administrations for the Parts that relate to the conservation of heat and power - it was first cited in Part L of the Building Regulations for England and Wales as a means of assessing dwelling performance in 1994; in 2006 SAP became the only method of demonstrating compliance
- HM Treasury's Stamp Duty exemption for zero carbon homes
- Department of Finance and Personnel for Northern Ireland Rate Relief Regulations for low and zero carbon homes
- As a National Calculation Methodology, as specified by the Energy Performance of Buildings Directive, SAP and its derivative Reduced Data SAP (RDSAP), which was developed in 2005, is used to produce Energy Performance Certificates
- To calculate the maximum allowable level of Green Deal finance for energy efficiency improvement measures
- To calculate Renewable Heat Incentive payments
- As an important element of the Code for Sustainable Homes score
- To calculate savings for measure installed under the Energy Companies Obligation (ECO)
- To calculate savings for measure installed under Warm Front
- To produce figures for local authority stock reporting, etc.

Furthermore, SAP has a consumer protection role. In general, consumers have neither expertise nor effective representation in matters related to the above policies. It is therefore essential that there is impartial and unbiased assessment via the NCM.

Thus, SAP helps DECC fulfil its duties to consumers, who might otherwise be misled by exaggerated manufacturer claims, potentially encouraging or forcing them to purchase products of little value (e.g. purchasers of new homes effectively paying for such products because the designer found they were the cheapest route to achieving Part L compliance). This emphasises that it is important that the default performance factors for technologies in the NCM are markedly conservative estimate of the typical performance of a range of products in that technology; and the measured performance of a particular product is tested against the same assumptions as everything else in the notional house as opposed to circumstances more favourable to its performance. In particular for Green Deal, Green Deal providers need a level of assurance that the financing instrument can be met from energy savings.

Assessing the performance of an energy efficiency measure is complex and it may not always be possible to describe it in terms of a single number for comparison purposes. In such instances the assessment of performance is only possible using whole-building assessments that utilise specific product performance data.

Energy Performance Assessments to deliver the Green Deal policy and most objectives in the ECO policy are undertaken using RdSAP (Reduced Data SAP), a simplified version of the SAP method that can be carried out more quickly and cheaply. The SAP method is used for new-build Building Regulation compliance and some ECO objectives.

In order to assess a dwelling's energy performance, information is needed that enables the assessment of the building fabric and building services. Such data is either generic, determined by the materials and type of product used ('type data') or specific, where validated individual branded product performance data has been made available ('product data'). Product performance data is normally held in the Product Characteristics Database (PCDB). Both SAP and RdSAP can read data held in the PCDB.

Typically, the performance of a product recognised as a new technology is initially assessed using data held in the Appendix Q database and undertaken as an adjunct to the SAP assessment. Consequently, this information cannot currently be used in RdSAP assessments, which use a simplified version of the SAP assessment developed for assessing existing dwellings. Product performance data held in the SAP Appendix Q database will generally migrate to the PCDB when a new version of SAP/RdSAP is released, enabling RdSAP assessors to access this data.



## Questions for debate

DECC has requested that BRE set-up a workshop session to discuss the following issues that affect the delivery of Green Deal and ECO policies, but are also critical to SAP's ongoing success. Item 3 is probably the most crucial of the issues:

### 1. Relationship between Appendix Q and RdSAP

How should we get new technologies into RdSAP more frequently, having been through an Appendix Q type process, now this is potentially to be updated annually?

We need to consider what principles can be applied such that RdSAP can be updated annually with information in Appendix Q before the 3 yearly update with SAP. We need to consider the pros and cons of how this might be achieved.

### 2. Faster Appendix Q2 process for low risk products

Should an alternative SAP 'Appendix Q2' application process be adopted allowing new technologies to be recognised in SAP using a simple and quick assessment method developed by BRE? Such an approach would need to encompass the following principles:

- a. It would need to impose a sufficiently conservative 'in-use factor' in the model (e.g. reducing savings by 50%) to downgrade the performance in lieu of a more detailed analysis being conducted
- b. Technologies could migrate to recognition via the standard Appendix Q application process in due course (with a lower or no 'in-use factor')
- c. The process would still require a robust naming and identification system (as per standard applications) such that SAP assessors can identify the technology for assessment purposes. This often takes time to develop.
- d. The process could only be adopted for technologies that pose minimal technical risk during and after installation.
  - i. One example could be a complex product that required complex technical documentation incorporating system design and installation guidance and training. In this case, BRE would need to undertake assessments of sufficient rigour to ensure energy savings could be delivered in practice. In this instance it may be that such technologies should not be recognised
  - ii. Another example could be a simple controller, where the only technical risk is correct identification by the SAP assessor

### 3. "De minimis" provisions in Appendix Q

The development of a 'de minimis' level of energy savings, whereby applications for recognition of new technologies within SAP would go through a still simpler Appendix Q process; or alternatively, be rejected for inclusion in SAP/RdSAP if potential savings were

below an agreed threshold. This is a crucial matter for on-going development of SAP, Green Deal and ECO.

The key issue is whether the benefit (in the form of energy saving) is disproportionate to the difficulty and cost of analysis to the manufacturer, where the result is unlikely to affect the SAP rating.

4. Publicly available “live” working version of SAP software between official versions?

It is necessary to have a version of SAP that is fixed for several years to support Part L of the building regulations. Would there be merit in maintaining a concurrent publicly available ‘development version’ of SAP which could be adjusted between official versions of SAP to incorporate new methodology? Potentially this could be used to support Appendix Q, by providing a means to include technologies not yet in full SAP. This would have the advantage of providing a ready-made consultation version of SAP (currently ‘cSAP’ is produced specifically for each consultation). If so, would there be any negative consequences for commercial software providers, or others?

5. Issues of liability

A number of situations can be envisaged when issues of liability could potentially arise. For example, who would be liable if:

- A Technical Note contained something that was incorrect.
- Changes were made to SAP as a result of an error being identified (e.g. perhaps an error in a PCDB data entry).
- PCDB records were removed or amended as a result of audits.....

6. Move to a fixed core calculation engine for SAP

At present each SAP software provider produces their own SAP calculation engine. This results in a possibility of inconsistencies between different versions of software and entails duplication of effort by software companies and additional software testing costs. Would it be better to produce a single core engine to be used by all SAP software, while still allowing software companies to compete on the quality of their interfaces? Would there be any disadvantages to this approach?

As an adjunct to this, one possible benefit is that it would be easier with a core software model to start to model dynamic situations, for example where several heat technologies supply heat to a cylinder in different circumstances. The downside is that the transparency of SAP may be compromised.