

Minutes of the second meeting of the SAP Scientific Integrity Group 21st Nov 2012.

Attendees

SAPSIG members:

Robert Lowe (RL) [Group chair]
John Counsell (JC)
John Tebbit (JT)
Martin Searle (MS)
Neil Cutland (NC)
Tessa Hurstwyn (TH)
Malcolm Bell (MB)

Government Department attendees:

Ken Bromley (KB) - DCLG
Apologies for absence – Alan Christie (DECC), Neil Witney (DECC), Francois Samuel (Welsh Govt), Gillian McCallum (Scottish Govt), Michael Hunter (Northern Ireland Govt).

BRE attendees:

Brian Anderson (BA)
Les Shorrock (LS)
Christine Pout (CP)
John Henderson (JH)
Will Griffiths (WG)
Paul Davidson (PD)
Apology for absence – Bruce Young (BY)

SAPSIG webpage

LS reported that the SAPSIG webpage, from which the group's Terms of Reference and the minutes of the first meeting could be downloaded, was now live. Comments from SAPSIG members on this were welcome. The only minor comment made in the meeting was that the download button, to access the posted documents, was not immediately obvious.

Minutes of last meeting

The minutes of the meeting of 8th August 2012 had been approved previously by members and they were now posted on the webpage. The main action in the minutes was for BRE to revise the Terms of Reference in consultation with DECC, to address various points that had been raised in the meeting. This had been done, the group had approved the amended document, and it was now posted on the webpage.

Declaration of interests

MS had submitted a declaration of interest regarding his representation of a heating appliance manufacturer on two HHIC committees. He had informed the company concerned that he was a member of SAPSIG and that this would prevent him from representing them in discussions involving the future of SAP, which they understood and accepted. The HHIC committees would also be informed that he would abstain from any discussions relating to

the future of SAP. SAPSIG members were content that given these assurances there was no conflict of interest.

Other interests were declared:

- MB mentioned that he had just completed work on a research strategy for mineral wool manufacturers.
- NC mentioned that he was working with Ofgem assisting them with the transition from CERT and CESP to the Energy Company Obligation (ECO).

In later correspondence, JC declared his interest in helping manufacturers to develop more advanced control systems for their energy using products. His interest was in ensuring efficient use of energy and resources and promoting grid friendly use of electricity, not in promoting any form of heating or appliance over any other. Thus, he assists all types of manufacturer in improving their controls for their systems and appliances, but he has no stake holding in any product that falls under SAP-based regulation in the market place.

Electric heating and carbon dioxide emission factors

Recently, there have been suggestions that for electric heating the carbon dioxide emission factors from night rate and day rate electricity need to be distinguished in SAP and, in particular, that a lower emission factor should be used for storage heaters. CP had undertaken an analysis to investigate this and had prepared a paper for consideration by the group.

The analysis indicated that the emission factor that applies to the profile of storage heater energy usage (based on a whole year of half hourly measured usage in 23 dwellings) is very similar to the overall annual average emission factor that SAP uses for all electricity use (and this was likely to remain so in the short term – i.e. over the lifetime of SAP 2012). Thus, the recommendation was that the annual average emission factor for electricity should continue to be used.

This recommendation led to much discussion, in the course of which differing views within the group were expressed. The overall outcome of these discussions was that, whilst the findings of the analysis were broadly accepted, it was agreed that there could be a case for using a higher emission factor for non-storage electric heating, and so a wider and on-going review of dynamic time-of-day emission factors was needed. The resulting research report would need to be put into the public domain to seek comments. This would clearly require a relatively large study so it could not be done in the short term, nor could it be done without additional funding, probably beyond that available within DECC's SAP budget.

For the short term, however, the following were agreed:

<p>The most immediate task was to assess whether the available data sources could be “pinned down” sufficiently well to undertake a wider study. CP and JC agreed to exchange information on data sources and to prepare a joint paper for the next meeting.</p>
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It was agreed that the current treatment of emission factors for electric heating in SAP had to remain unchanged for SAP 2012 (i.e. the recommendation of CPs report was accepted). This was because changes of the sort being discussed had not formed a part of the SAP 2012 consultation.

Although the decisions for the short term were for no change to the current SAP assumption, it was noted that dynamic electricity tariffs already existed in Scotland so this was actually a current issue and it could be expected to increase in importance in future with the anticipated introduction of smart meters, and smart grid technologies.

However, regarding the time period over which the carbon dioxide emission factors used in SAP were determined, it was noted that this probably needed to continue being restricted to 5 years as at present. There would be huge difficulties in projecting forward beyond 10 years because the position at that time would depend entirely on the outcome of policies, such as grid decarbonisation, and the uncertainty would be so great that the analysis might simply not be worthwhile.

Electrically led micro-CHP

BY (not present) had prepared a paper which outlined the three possible approaches that were discussed at the first meeting:

(1) Utilisation of 'waste heat'

This is similar to the existing approach in SAP for waste heat supplied from a large power station to a community heating scheme. Heat is regarded as the by-product of a process (in this case electrical generation) being undertaken for reasons other than provision of a building service.

(2) Functional apportionment: duty as CHP

An attempt is made to apportion the function of the product, separating duty as CHP from duty as a generator alone. Duty as CHP means the extent to which heat produced is useful to the building, expressed as a fraction of total heat produced and named the "Building service fraction".

(3) Functional apportionment: duties as both CHP and generator alone

This approach is similar to no. (2), but also takes into account the energy input and output when operating as a generator alone.

The paper provided outline figures illustrating the large differences, in energy terms, between these different approaches and recommended the second option as being the fairest and best in terms of maintaining the scientific integrity of SAP as a model for producing energy ratings of buildings.

WG introduced the paper and its recommendation to the group. However, the group members felt unable to accept this recommendation. Some preferred the third option. In

particular, it was argued that it is necessary to take account of all inputs and outputs and also that it was important not to let politics get in the way of technical discussions. It was also noted that in low energy homes heating was used in a different way to conventional heating and that continuous heating might be required for efficient operation which should not be penalised.

The distinction between the role of the model and the role of policy was raised several times in discussion, as was the view that the model treatment was an oversimplification – a model that fully deals with both supply and demand side issues is really required (which goes well beyond the remit of SAP). Whilst this may be the case, a short term solution was required given that these devices were being installed in dwellings now.

It was suggested that the short term solution was to simply acknowledge that SAP does not deal with this type of equipment, and that SBEM should be used instead.

However, it was not entirely clear whether SBEM could deal with such equipment, so this first needed to be checked. *(Following the meeting this point was checked with the SBEM team and it was confirmed that it did not provide an alternative to SAP in such cases).*

JT further pointed out that he had proposed in correspondence with BY and MS that a system of classification of equipment was needed in order to first allocate equipment to a relevant category, before even considering the appropriate treatment. If this was not done, every single instance of newly introduced equipment would require an individual analysis to be undertaken, which was not sensible. WG noted that BY had not mentioned this matter in his paper but he had also asked that it be raised in the meeting. Nobody disagreed with the idea of introducing a classification scheme, although this did raise further questions as to whether it is actually the role of SAPSIG to proactively suggest 'strategic' process changes of this nature at all.

It became clear in discussion that no decision on the short term solution could be reached unless some numbers were made available indicating the effect of the different options on the SAP ratings of dwellings. This did not require a full SAP calculation model to be implemented. A broad brush approach using a spreadsheet would suffice.

WG agreed to look at running some numbers with such a spreadsheet, for presentation at the next meeting. This would allow a sensitivity analysis to be undertaken that would help the group understand the implications of the different options.

One member cautioned that a short term interim solution could potentially lead to problems in the longer term (i.e. it might result in inconsistent treatments of differing technologies, undermining the balanced approach that is required in SAP across all technologies). In this regard, it was noted that SAPSIG's role was to help BRE and DECC to take a coherent approach, or to make it clear what would be needed to take a coherent approach. Potentially, this might mean using dynamic simulation tools in certain situations where the simplified SAP approach is difficult to apply.

Voltage Optimisers

A paper on voltage optimisers that had been circulated ahead of the previous meeting had not been fully discussed at that meeting, and so had been circulated again. Although not explicitly stated as a recommendation, the BRE view expressed within this paper was that savings from voltage optimisers could only be allowed if they were achieved with improved efficacy (i.e. the same service was supplied at lower energy use). Documents that aimed to address this had very recently been received, via DECC, from the voltage optimiser industry and these had also been circulated ahead of the meeting. The discussion focused on the information that had been received from the voltage optimiser industry.

It was noted that the vast majority of the domestic electrical load was resistive, and voltage optimisation would produce no savings on this resistive load. Furthermore, tests on individual products such as refrigerators did not really help assess the effect of voltage optimisers on the entire load of a dwelling, which was a mixture of different types of load.

It was also noted that appliances with high energy ratings show no real saving from voltage optimisers, so it is only for existing appliances where there would be any benefit. Given the relatively short lifetimes of many household appliances, therefore, voltage optimisers could only provide benefits in the short term. It was suggested that this short term benefit may mean that the Green Deal golden rule might not be met by voltage optimisers.

A key question that needed to be asked was whether savings from voltage optimisers should be a part of SAP at all. One member argued that because voltage optimisers mainly save energy by reducing the consumption of household appliances (or by reducing the efficacy of lighting) they fall outside the remit of SAP. Others took the view that anything that saves or generates electricity in a domestic setting should potentially be allowable.

However, it became clear in the discussions that the group members really did not feel that they were in a position to be able to take a view on the merits of voltage optimisers being included in Green Deal/SAP. A presentation and supporting documentation was requested, preferably from an independent third-party, setting out the technical principles by which domestic electrical load energy savings are possible. This presentation should include reported energy savings with switched mode power supplies and Variable Speed Drive motors.

WG agreed to contact the authors of the EA Technology paper that had been received via DECC to see if a suitable briefing could be arranged for the next meeting.

The group essentially needed to know what real evidence is available and whether these devices actually matter in a domestic context. This would allow the group to advise on the priority of this issue – although it was also noted that it is SAP's job to impartially model the effect of products, not to say whether they are “good” or “bad”.

Following the meeting, some further points were raised in correspondence. In particular, it was noted that the savings shown in the documents received were probably due to two effects – reduced power losses in inductive loads (fridges, pumps, motors, etc), and

ensuring that devices were regularly operating close to their design voltage (normally 230V). If the first effect was dominant the savings would be very short lived because appliances would be replaced with new equipment for which there would be little or no saving from a voltage optimiser. If the second effect was dominant then the savings may be longer lasting. The limited evidence supplied suggests that the first effect was the most important. One further important matter that needs to be considered is what the losses are from the voltage optimiser itself. No information had been provided on this, but it could be significant.

Demand control ventilation

There was insufficient time to discuss this agenda item. However, WG indicated that some work on this topic was currently underway, and it would therefore be better discussed at the next meeting anyway. The topic was referred forward to the next meeting.

Any other business

It was proposed that hot water use should be a research topic for discussion at the next SAPSIG meeting as this was becoming of greater importance in the low energy homes that are now being built. JH noted that, in connection with the Green Deal Occupancy Assessment, there had already been some recent SAP developments in this area related to the use of showers.

Next meeting

Some work was required ahead of the next meeting, as had been identified in the discussions. The timescale for this needed to be considered before a firm meeting date could be set. However, the aim was to hold a meeting in late February / early March if possible.