SAP Workshop

26 November

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NHBC

Introduction

Mark Gouldstone
Product Manager – Technical Compliance Services

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Agenda

- NHBC Standards, Quality and February Workshop Update
- BEIS – Policy and Political Update
- MHCLG Update
- RDL QA Work Update (inc SAPIF)
- SAP Perspective and HBF FPNH
- What we want from you after the break

- AES – SAP in Reality
- SAP10 Open Discussion
- Summary and Close

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NHBC Standards, Quality and February Workshop Update

Rob Pannell
Construction Quality Advisor

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BEIS – Policy and Political Update

Katy Read

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MHCLG Update

Victoria Tink

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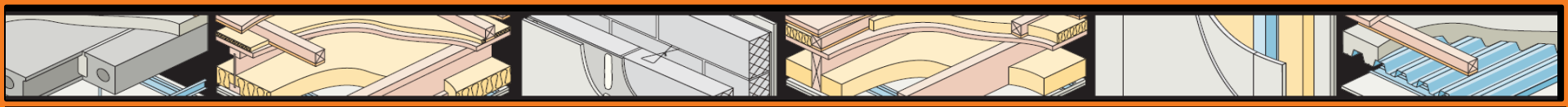

Robust Details
SAP Workshop 2

November 2018

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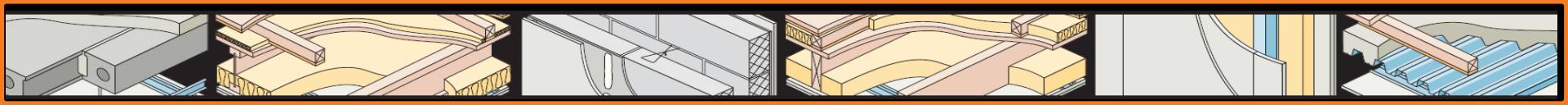

John Tebbit
Lot 4 of SAP Contract

All things SAP

- SAP and RDL's QA work
- SAPSIG
- SAPIF
- SAP Workshop 2
- Questions

SAP and RDL's QA work

A quick recap

- Last summer RDL was awarded Lot 4 for QA work connected with the contractor for Lots 1, 2 and 3 of the SAP contract.
- This relates to BRE's work on the SAP model, the approval of SAP software from third parties and the Product Characteristic Data Base
- The joint setting up (with BRE) of the SAP Industry Forum plus secretariat duties
- Continued running of the SAP Scientific Integrity Group
- QA work for BEIS regarding BRE's work

SAP and RDL's QA work

Still to do

- Improvements in the PCDB, both operationally and in documentation
- Publication of better guidance on Appendix Q to help prospective users understand the likely data requirements for any inclusion in the Appendix
- Joint managing with BRE the SAPIF SAP11 programme
- Assisting as appropriate in industry – government – BRE communications

SAP versions made easy

- Currently using SAP2012 version 9.92 October 2013 with current Part L
- A consultation version called SAP2016 was consulted on end of 2016, beginning 2017.
- That has now become SAP10.0, published this summer as a specification and later a software implementation (both via BRE website) **for information only**
- A revised consultation version, SAP10.1, taking into account feedback from users, will be published with the next Part L consultation
- When Part L 2020 is finally implemented, SAP10.2 will be published for use as the Building Regulations compliance tool
- SAP11 is in very early development for mid 2020s onwards

SAPSIG

What SAPSIG is

- SAPSIG is a group of technical experts who help ensure that SAP has scientific and technical integrity
- Essentially very techie non-executives
- Review and respond to BRE's work on SAP
- Meet a couple of times a year but also do electronic consultations
- Bound by confidentiality and conflict of interest arrangements
- RDL chairs and provides secretariat
- Covers all versions of SAP

SAPIF

What SAPIF is

- SAP Industry Forum is a group for industry, BRE and government to discuss and work on SAP
- Broad representation, particularly but not exclusively representative bodies
- Technical competence is necessary
- Met twice and now setting up Working Groups for more detailed work
- Bound by confidentiality and conflict of interest arrangements, but less onerous than SAPSIG
- RDL chairs and provides secretariat. BRE are joint ‘owners’ with RDL
- Currently focused on SAP11

SAPIF Working Groups

- Domestic Hot Water
- Smart controls
- Energy storage at domestic scale
- Ventilation and IAQ
- Overheating and cooling

Scope of WGs is to provide report by 2020Q1on the expected state of the art for their respective technologies in the early 2020s, sources of data on performance and ways of modelling these technologies that could be used in SAP11

First reporting anticipated Spring 2019

SAP Workshop 2

It is about SAP10

- For all parties to learn how SAP10 works in practice on real systems and dwellings
- Particularly changes in relative performances of different technologies compared to SAP2012 (current compliance tool)
- Identify areas of potential confusion, lack of clarity, bugs in the software and general technical feedback. Must be seen as an early beta version of software
- Suggestions for improvements
- Views on potential impacts and outcomes
- Eventually to say to government whether the early sight and trial of a new version of SAP, separate to any Part L consultation, is helpful or not

Questions

Any questions?

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SAP Workshop 2018

Home Builders Federation
Craig Ferrans HBF Technical Director

Who are the Home Builders Federation

The Home Builders Federation represents over 200 house builders and more than 200 associate members from businesses across the UK

HBF members build around 80% of new homes

We lead the industry on policy and regulatory affairs and have successfully lobbied the government to ensure a positive operating environment for members

HBF is key stakeholder for all Government discussions on house building and has helped to inform the government on key policies

HBF host a series of Technical Subgroups to support key industry challenges

HBF Groups

1. National Technical and Sustainability Group
2. Host 8 Regional Technical Meetings
3. Contaminated Land
4. **Future Performance of New Homes**
5. Highways
6. Water Matters
7. Quality
8. Modern Methods of Construction
9. Tall Buildings
10. On-construction Waste
11. Water and Sewerage Futures Group
12. Health and Safety Forum
13. Digital Construction Group

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The voice of the home building industry

www.hbf.co.uk | 0207 960 1600 | twitter: @homebuildersfed

What we want from you after the break…

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AES – SAP in Reality

Silvio Junges
Senior Sustainability Consultant

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NHBC / Robust Details SAP workshop

Assessing performance under SAP 9.92 and SAP 10.0

1. How does SAP work?
2. Modelling SAP 10.0
    1. House Types – SAP 9.92 vs SAP 10.0
    2. Mains Gas vs Electric Heating vs Heat Pumps
    3. Shower Flow Rates
    4. Mains Gas Showers vs Electric Showers vs WWHR
    5. Renewables – Photovoltaic
    6. Apartments – Communal Heating (CHP & back up mains gas boiler)
    7. Overheating
3. Impacts on Manufacturers

26th November 2018

How does SAP work?

Assessing performance under SAP 9.92 and SAP 10.0

- Actual vs. notional building with fixed values
- Mains gas boiler
- Intermittent fans
- Medium thermal mass
- Fuel factors from Part L

Notional (Elemental Recipe – SAP 9.92)

Element or System	Values
Opening areas (windows and doors)	Same as actual dwelling up to a maximum proportion of 25% of total floor area [1]
External Walls (including opaque elements of curtain walls) [6]	0.18 W/m²K
Party Walls	0.0 W/m²K
Floor	0.13 W/m²K
Roof	0.13 W/m²K
Windows, roof windows, glazed rooflights and glazed doors	1.4 W/m²K [2] (Whole window U-value) g-value = 0.63 [3]
Opaque doors	1.0 W/m²K
Semi glazed doors	1.2 W/m²K
Air tightness	5.0 m³/hr/m²
Linear thermal transmittance	Standardised psi values – See SAP Appendix R, except use of y=0.05 W/m²K if the default value of y=0.15 W/m²K is used in the actual dwelling

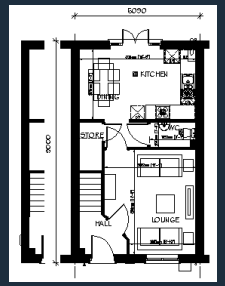
Modelling SAP 10.0

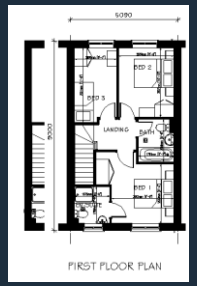
Assessing performance under SAP 9.92 and iSAP 10.0

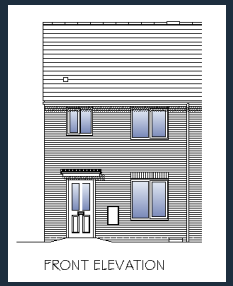
- Does not give an indication on how SAP 10.0 will influence building regulations compliance for new dwellings.
- Any changes to the next version of Part L1A are expected to form part of a consultation in early 2019.

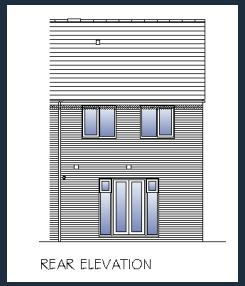
Modelling SAP 10.0

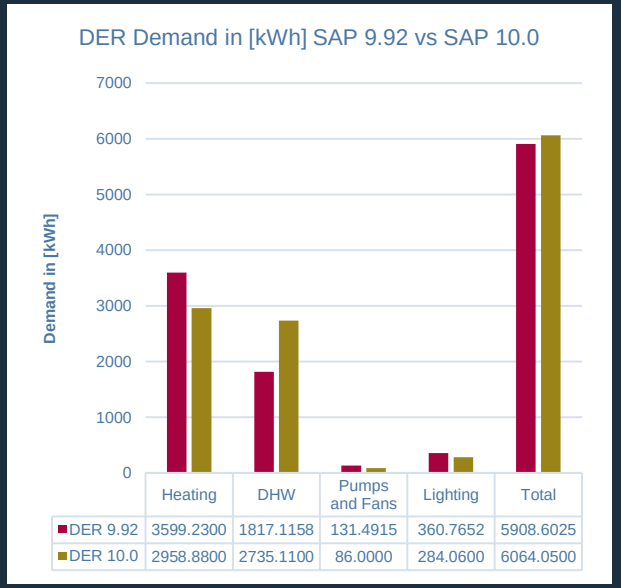
End-Terrace (2-storey / 2 bed / bathroom & En-suite)

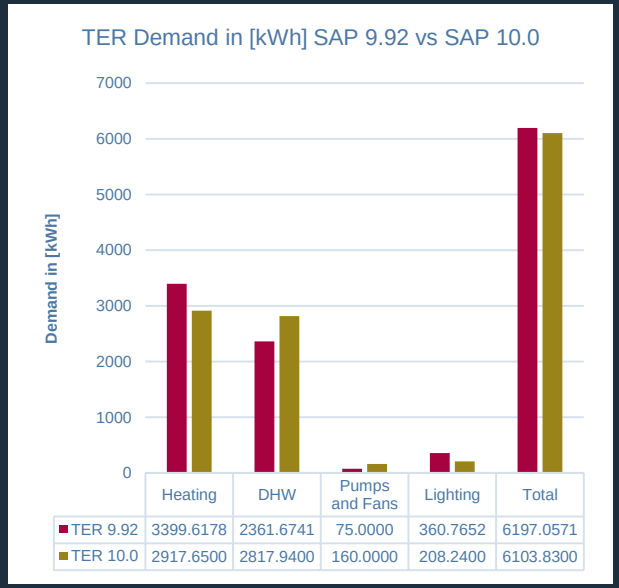






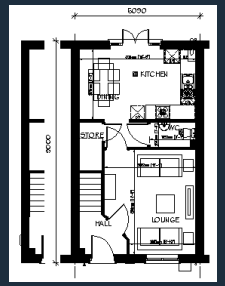


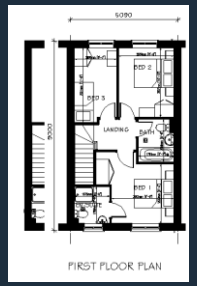


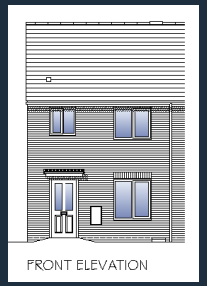


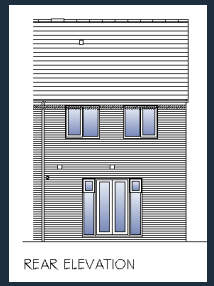
Modelling SAP 10.0

End-Terrace (2-storey / 2 bed / bathroom & En-suite)







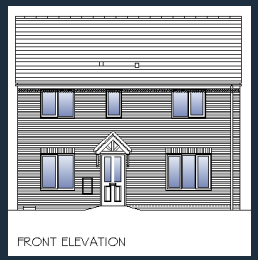


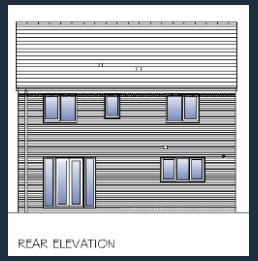
Carbon	DER	TER	%	DFEE	TFEE	%
SAP 9.92	18.07	18.64	**3.06**	48.90	52.44	**6.75**
SAP 10.0	16.77	16.35	**-2.54**	43.66	45.51	**4.06**

Primary Energy	Actual	Notional	%-imp.
SAP 9.92	84.19	N/A	N/A
SAP 10.0	91.91	89.68	**-2.49**

Modelling SAP 10.0

Detached (2-storey / 4 bed / bathroom & En-suite)



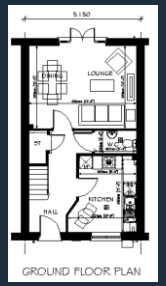


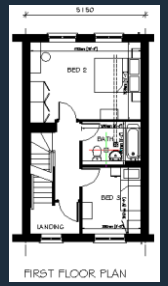
Carbon	DER	TER	%	DFEE	TFEE	%
SAP 9.92	16.42	16.50	**0.48**	49.25	55.56	**11.36**
SAP 10.0	14.93	14.35	**-4.03**	44.60	49.42	**9.76**

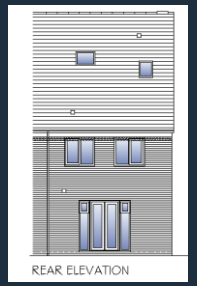
Primary Energy	Actual	Notional	%-imp.
SAP 9.92	78.28	N/A	N/A
SAP 10.0	81.67	78.40	**-4.17**

Modelling SAP 10.0

Mid-terrace (2.5-storey / 3 bed / bathroom & En-suite)





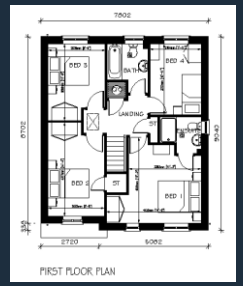


Carbon	DER	TER	%	DFEE	TFEE	%
SAP 9.92	15.43	15.75	**2.03**	43.56	46.24	**5.80**
SAP 10.0	14.13	13.66	**-3.44**	39.26	40.56	**3.19**

Primary Energy	Actual	Notional	%-imp.
SAP 9.92	71.53	N/A	N/A
SAP 10.0	77.48	74.89	**-3.46**

Modelling SAP 10.0

Detached (Garage, 2-storey / 4 bed / bathroom & En-suite)



Carbon	DER	TER	%	DFEE	TFEE	%
SAP 9.92	19.10	19.12	**0.10**	58.82	63.31	**7.09**
SAP 10.0	17.87	16.94	**-5.48**	53.56	56.54	**5.26**

Primary Energy	Actual	Notional	%-imp.
SAP 9.92	90.69	N/A	N/A
SAP 10.0	97.48	92.42	**-5.48**

Modelling SAP 10.0

Summary Comparison SAP 9.92 vs. SAP 10.0

		DET	END	MID	DET (G)
Carbon	%-impr. SAP 9.92	3.06	0.48	2.03	0.10
	%-impr. SAP 10.0	-2.54	-4.03	-3.44	-5.48
Fabric	%-impr. SAP 9.92	6.75	11.36	5.80	7.09
	%-impr. SAP 10.0	4.06	9.76	3.19	5.26
SAP rating	SAP 9.92	83B	84B	85B	83B
	SAP 10.0	84B	85B	86B	83B

Modelling SAP 10.0

Summary Comparison SAP 9.92 vs. SAP 10.0

- Abs. DER / TER decreased due to lower carbon emissions from electricity
- Abs. DFEE / TFEE decreased due to change in how internal gains are calculated in SAP
- Primary Energy (actual vs. notional) approximately in line with %-reduction of new DER / TER
- Heating demand decreased due to change in heating pattern
- DHW demand higher but will be sensitive to actual flow rates
- Notional lighting demand lower than SAP 9.92
- Notional ventilation demand higher than SAP 9.92

Modelling SAP 10.0

Comparison Mains Gas vs Electric Heating vs Heat Pump

	Mains Gas	Electric Heating	Heat Pump
DER SAP 10.0	14.93	14.85	8.60
TER SAP 10.0	14.35	21.79	
%-improvement	**-4.03**	**31.85**	**60.53**
Primary (Actual building)	81.67	110.73	64.16
Primary (Notional building)	78.40	78.40	
%-improvement	**-4.17**	**-41.28**	**18.16**
Fuel Factor (L1A 2013)	1.00	1.55	1.55

Fuel Factors are subject to a Part L consultation early 2019

Modelling SAP 10.0

Comparison Shower flow rates - Part G vs restrictors

	Part G Typical	HQM optional	HQM advanced
Litres/person/day / (flow rate)	125 (10 l/m)	110 (8 l/m)	100 (6 l/m)
DER SAP 10.0	14.92	14.48	14.03
TER SAP 10.0		14.35	
%-improvement	**-4.03**	**-0.91**	**2.23**
Primary (Actual building)	81.67	79.27	76.88
Primary (Notional building)		78.40	
%-improvement	**-4.17**	**-1.11**	**1.94**

Modelling SAP 10.0

Comparison Showers - Mains gas vs electric showers vs WWHR

	Base Case	Electric	WWHR
	Mains Gas	Electric En-Suite	Bathroom only
DER SAP 10.0	14.93	14.37	14.31
TER SAP 10.0		14.35	
%-improvement	**-4.03**	**-0.14**	**0.28**
Primary (Actual building)	81.67	79.96	78.35
Primary (Notional building)		78.40	
%-improvement	**-4.17**	**-1.99**	**0.06**

Modelling SAP 10.0

Comparison PV – SAP 9.92 vs. SAP 10.0 carbon factors (1.0 kWp)

	SAP 9.92 (none or very little)	SAP 10.0 (none or very little)	MCS overshading (Shading Factor 0.89)
Carbon emissions electricity	0.519	0.233	0.233
DER	13.60	13.66	13.80
TER	16.50	14.35	
%-improvement	**17.59**	**4.81**	**3.83**
Primary (Actual building)	60.46	72.21	73.26
Primary (Notional building)	N/A	78.40	
%-improvement	**N/A**	**7.90**	**6.56**

Modelling SAP 10.0

Summary Comparison – Heating, Showers and PV

- SAP 10.0 does favour electric heating under carbon emissions, but results likely to change with Part L consultation (fuel factors).
- Primary energy results indicate a fail of building regulations
- Shower flow rates influence carbon & primary energy emissions
- Electric instantaneous showers are now included
- WWHR offers a good improvement in carbon or primary energy
- Energy demand for lighting is low but can tip the balance. Full lighting designs required at As Built stage (not modelled)
- Yield from PV almost halved due to lower carbon emissions from electricity.

Modelling SAP 10.0

Impact on communal heating (CHP & mains gas boiler)

	SAP 9.92	SAP 9.92	SAP 10.0
Carbon emissions electricity	0.519	0.233	0.233
DER	12.93	14.29	19.07
TER	18.67	15.81	
%-improvement	**30.74**	**9.56**	**-20.62**
Primary (Actual building)	60.89	N/A	95.48
Primary (Notional building)	N/A	N/A	86.87
%-improvement	**N/A**	**N/A**	**-9.91**

Modelling SAP 10.0

Summary impact on communal heating (CHP & mains gas boiler)

- Design heat loss of distribution system has a significant impact on carbon compliance.
- The lower carbon factor of electricity does diminish the benefit of an CHP exporting electricity to the grid.
- Together with less benefit from PV, a new approach to meet London Plan requirements is required.

Modelling SAP 10.0

Overheating in SAP 10.0 – Impact Assessment

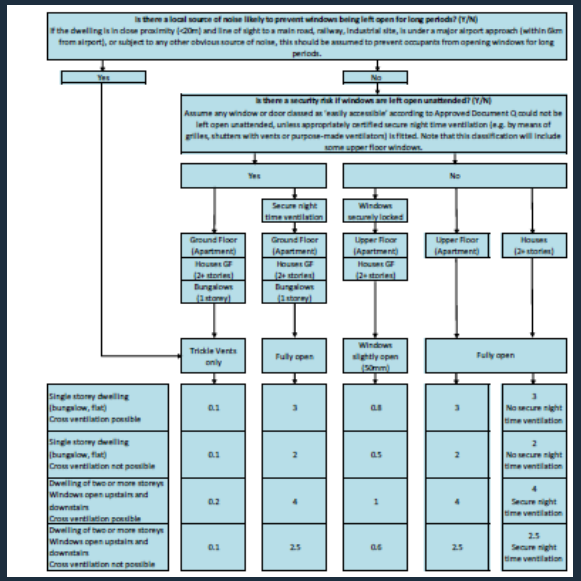
	ACH	Criterion 3
Houses	3.0	Slight
Apartments (GF)	0.1	High
Apartments (UF)	2.0	High

- ACH halved in comparison to previous version
- Security (Part Q) and noise need to be accounted for
- Secure night time ventilation and/or mechanical ventilation required

Window Opening	Effective air change rate in ach		
	Trickle vents only	Windows slightly open (50 mm)	Fully open
Single storey dwelling (bungalow, flat) Cross ventilation possible	0.1	0.8	3
Single storey dwelling (bungalow, flat) Cross ventilation not possible	0.1	0.5	2
Dwelling of two or more storeys Windows open upstairs and downstairs Cross ventilation possible	0.2	1	4
Dwelling of two or more storeys Windows open upstairs and downstairs Cross ventilation not possible	0.1	0.6	2.5

Modelling SAP 10.0

Overheating in SAP 10.0 – Likely Impact Assessment

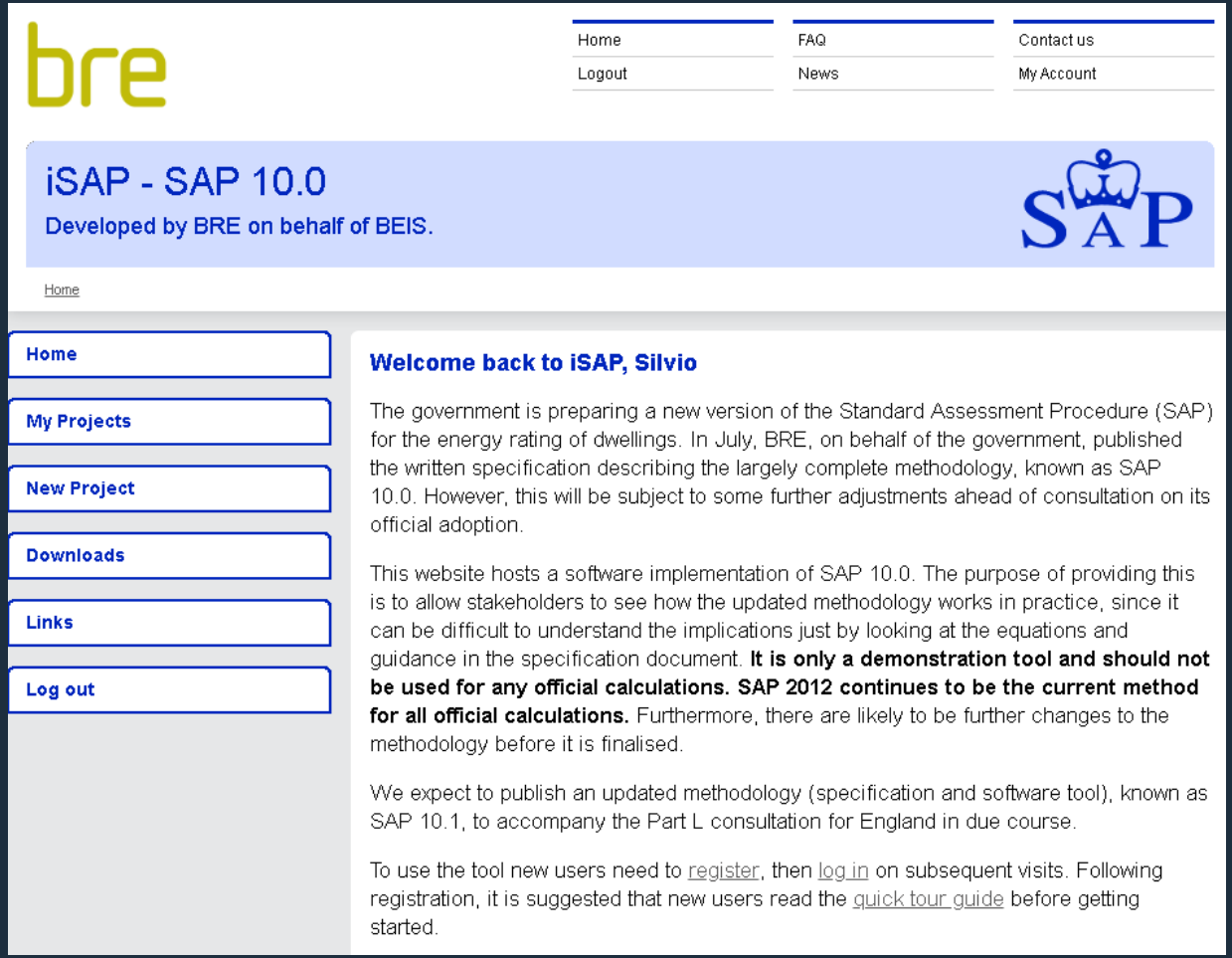


Full document can be downloaded under: http://aessc.co.uk/blog/sap10

Impacts on manufacturers

Summary impact on manufacturers

- DHW demand to be delivered more efficiently (summer efficiency and/or flow restrictors)
- Electric showers are a viable solution, but need to meet customer requirements
- Lighting designs should be developed at design stage or a content specification with minimum values
- MCS certificate should state the Shading Factor at design stage
- Mechanical ventilation systems meeting minimum Part F standards
- New approach to achieve London Plan may be required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iSAP - SAP 10.0
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Welcome back to iSAP, Silvio
The government is preparing a new version of the Standard Assessment Procedure (SAP) for the energy rating of dwellings. In July, BRE, on behalf of the government, published the written specification describing the largely complete methodology, known as SAP 10.0. However, this will be subject to some further adjustments ahead of consultation on its official adoption.
This website hosts a software implementation of SAP 10.0. The purpose of providing this is to allow stakeholders to see how the updated methodology works in practice, since it can be difficult to understand the implications just by looking at the equations and guidance in the specification document. It is only a demonstration tool and should not be used for any official calculations. SAP 2012 continues to be the current method for all official calculations. Furthermore, there are likely to be further changes to the methodology before it is finalised.
We expect to publish an updated methodology (specification and software tool), known as SAP 10.1, to accompany the Part L consultation for England in due course.
To use the tool new users need to register, then log in on subsequent visits. Following registration, it is suggested that new users read the quick tour guide before getting started.

SAP10 Open Discussion

Summary and Close

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