RdSAP - Problems

RdSAP should be replaced by an enhanced SBEM

The Context:

The planet is in trouble with Global Warming. Many worthy bodies blame this on the way we produce and use energy and thus increase Greenhouse Gas emissions. A high proportion of energy use takes place in buildings. It is therefore desirable to promote energy efficiently both by using less and by installing more efficient energy consuming devices.

This leads to having a measure of this efficiency – the Energy Performing Certificate (EPC). Two suites of software (RdSAP and SBEM) software were developed in order to create EPCs for both domestic and non-domestic properties.

Politics and economics aside the ultimate goal is to save the planet by economizing on energy use and thereby reducing greenhouse gas emissions. Consumers naturally want to reduce their costs. It is a consequence that by reducing energy use costs will be reduced. Emissions will be reduced simultaneously. Emissions and costs are each a function of energy use.

The Problems:

These two sets of software should be working together but pull in different directions. For a start the score scales work in different directions. A high number for RdSAP is good. A high number for SBEM is bad. One scale shows costs the other shows contribution to atmospheric pollution. There must be a way to present results in a manner that portrays both variables.

The mechanics of using the two different sets of software are a bit confusing. The level of detail is not consistent between RdSAP and SBEM. And the level of detail ***within*** each system is also inconsistent.

It is as if the level of detail available in different building details was selected at random. Fine detail is available in some areas but not in all areas. This varies across different areas of construction and varies between RdSAP and SBEM.

There is no consistency within the software specification. It is as if different sections of the programming were specified by different departments and the actual programming was not managed centrally across the whole suite of modules nor across time.

This is typical of government committees where the personalities are not intimately knowledgeable of the subject matter and the personalities change over time. So, there has been no consistent overall strategy.

A lot of hard work has gone into the various sections, and they all work within a particular niche. But the individual modules were not specified in a consistent manner. The end requirements were not tight enough and the scope may not always have been broad enough.

RdSAP and SBEM have been converging over the years. The latest step is the coming requirement to measure all windows in domestic properties.

The current domestic EPC report is of less use than the original report. Previously the original report was overt in showing not only a costs graph but also a representation of the potential environmental consequences of the calculated EPC score. This was easy to understand and kept a better focus on saving the planet. The old report should be reinstated.

The Solutions:

RdSAP and SBEM have been converging over the years and so should be amalgamated.

The old EPC report should be reinstated.

SBEM should adopt the RdSAP method of giving an overall date

SBEM should include a boiler look-up function

There are several suggestions in the following text.

The Facts:

General Set-up information

At this stage SBEM gathers basic information including details of property address, ownership and relationship with the assessor.

SBEM does NOT include the build date whereas RdSAP will ask for a date band. This is critical to the whole calculation process. The software will make assumptions about materials used and U-values etc.

Using SBEM, at a later stage the date parameter can be expressed when giving Building Regulation date to the individual build style of various envelopes (walls, floors etc). But this

does not give the same spreads of date bands as seen in RdSAP. This demands a date decision is determined against each individual envelope. It might be possible to have several different types of walls (for example) and each will need to be given a building Regulations date. It is much simpler to adopt the RdSAP method of giving an overall date to the building as a whole. Sbem would then allow for the setting up of an additional wall type to be used where appropriate.

General Set-up Property Type

SBEM asks what type of property is being assessed. This is good as expectations are made as to the energy load to be expected. Within a property type different zone types may be specified. This includes residential property types and within that may be warm habitable rooms, cool non-habitable rooms and warm wet rooms. Each of these will put different demands on the property in terms of expected heat requirement and ventilation.

This is a good feature of SBEM, not entirely lacking in RdSAP where bathrooms can be specified but kitchens may not. RdSAP will assume there is a kitchen area, but there is no way of making any edits to cover just that one zone as distinct from others. SBEM allows for extractors to be placed into kitchens (or indeed any zone). RdSAP does not.

This is the beauty of SBEM, as each zone may be tailored bit by bit to make it well described. RdSAP relies on the average use of the average building in an average environment. SBEM asks what each zoon is being used for. SBEM also asks which part of the country the property sits and its north-south orientation. So SBEM has a better grasp on the environment in which the property sits.

Libraries Constructions

SBEM allows a wide range of options when describing major building elements; floors, walls, roof and doors.

It is possible to pick from English **Building Regulations dates** (nodate,65,73,85,90,91,95,99,02,06,10). This does not compare to the greater date range provided by RdSAP (pre-1900,1900, 30, 50, 67,76,83,91,96,03,07,11). The RdSAP dates look at the period of building before Building Regulations were implemented. Otherwise, the later dates are roughly equivalent. It would be preferrable if SBEM mirrored the date input style used in RdSAP.

The available descriptors of construction elements include:

- **The sector** to which the element belongs (Educational, Health, Hotels, Industrial, Leisure. Office, Retail).
- A wide variety of **construction details**
- **Exposure** (conditions space, Exterior, same space, ventilated etc). The exposure can be further altered room by room if necessary.

- Also, the **default usage** where for example there are several wall types but one will be specified as the default external wall. Again, the wall type can be further edited room by room if necessary.

The detailed specification of building elements may be arrived at through INFERENCE or LIBRRY Information. The Inference route gives broad default construction types. The Library values are very detailed. This allows for building construction styles but stops short of being able to specify full details of insulation.

For example, a suspended floor may be described as “Suspended gd floor (E&W) 1990 Part L”. This is OK if you have intimated knowledge of all the building regulations over the years.

RdSAP allows for the specification of the thickness of the insulation in more instances than does SBEM.

Alternatively, it is possible with SBEM to specify insulation thickness in a cavity wall. However, this facility does not extend to metal cladding systems (back to Build Regs Dates).

Floors

SBEM allows the specification of a floor as being a ground floor or a mid-level separating floor. It is therefore possible to specify the characteristics of a floor between different levels of a building. RdSAP does not have this feature.so the heat transfer between a warm bedroom and a cool corridor is not taken into account.

Both RdSAP and SBEM allow for suspended timber floors. If they have been retrofitted with insulation, RdSAP allows the depth of the insulation to be entered. SBEM forces the choice of many different dates of building regulations, but not an actual depth of insulation, which would be much simpler.

Alternatively solid ground floors get a different treatment. SBEM relies on knowledge of the building regulation dates. RdSAP in this circumstance simply allows the description, “SOLID” but in the background is working with the build date. So, in a way both sets of software get to probably the same answer but by a different route. They make assumptions based on build date and the regulations in force at that point.

Walls

Both RdSAP and SBEM will allow a wall to be described as dry lined. RdSAP does not allow for insulation. SBEM dry lining can be insulated or not insulated, but only if brick or stone. This facility does not extend to other forms of construction such as cob or concrete.

Wall thickness can be input to RdSAP at any value desired. Thickness may be entered up to 1600mm. SBEM only allows for wall thickness with brick walls, and then only to four different values.

The number and variety of wall type is far greater within SBEM, but The RdSAP choices cover well for domestic purposes. One type missing is the PVC plastic walling often seen in conservatories and new porch extensions. Timber framed seems the best fit here but is not really correct. The same gap appears with roofing materials – flat polycarbonate roofs.

Roofs

The variety of roof types is far greater in SBEM. RdSAP allows for insulation thickness to be specified for both pitched and flat roofs. SBEM allows for thickness in pitched roofs but not so with flat roofs; mineral wool can be specified but not its thickness.

Glazing types

Both softwares deal with a variety of glazing types but SBEM is more detailed and specific. It allows for building regulations compliance date, number of panes, coating, frame material. But RdSAP also takes much the same information but in a different manner.

Window Measurements

Within RdSAP windows are described as being either single, double or triple glazed. There is provision to specify pre or post 2002 but that is about it. Coming though will be far greater detail, not in the glazing specification but in the placement of windows. The north-south orientation will be captured as well as the height and width. Also, it will be possible to specify exactly what type of window is in each room rather than a more global approach of percentage of D/G.

SBEM currently allows for any number of different glazing types as well as capturing zone by zone the dimensions and orientation.

So RdSAP will be more or less in line with SBEM on this parameter.

HVAC

Heating systems are all important and probably, after insulation, the most important contribution to the EPC score. What a pity SBEM makes it so difficult. RdSAP gives a handy search function allowing DEAs to find the correct boiler from within the software. This gives a starting point for the boiler efficiency. This figure is modified depending on the configuration of the controls.

SBEM offers no consistent help in this area. CEAs are forced out into a boiler database to then find the boiler and decide which of several figures to use as an efficiency figure. SBEM should include a boiler look-up function.

Any boiler controls are used to modify the efficiency by minute amounts as advised in the assessors' conventions (which have changed).

Air conditioning is treated quite differently in the two systems. The closest RdSAP comes to A/C is to specify for an ASHP which can be used in either direction if the correct air-to-air unit is purchased.

SBEM has a whole range of detail to be described. This ranges from simple split systems to whole building systems with large roof mounted fan units and lengths of ducting. This naturally is more than needed for domestic properties, but RdSAP is inadequate in this area and needs further development.

Dimensions

The length and width of rooms and zones are standard measurements. Neither will set a room apart from other rooms. However, the height of rooms and zones is enough to cause a shift in the structure of an EPC. With RdSAP if all rooms are the same height, they can usually exist in the same building part (all other things being equal). However, if one room has a different height it must be captured within a different extension. This may make only a small difference in most cases and a DEA may be tempted to overlook a 5mm difference. In older buildings often high Victorian ceilings are combined with rear extensions of the same build style but very different ceiling heights. Thus, a building which might be thought of as consistent becomes two sections (parts). This quirk was previously a problem when the RdSAP software originally allowed for only one extension. Sometimes the previous example may also have a modern cavity wall add-on, requiring another extension.

This has never been a problem with SBEM as it is possible to give every zone in a building its own individual ceiling height.

The facility to have up to four extensions, in a domestic EPC is an example of how the two sets of software have converged. The RdSAP solution is a fudge making up for the lack of detail being picked up by RdSAP. The is the meaning of Rd (Reduced Data). In the initial stages when many assessors needed to be trained up very quickly on software that was easy to use, the reduced data was probably the best tactic.

Extensions

The concept of extensions does not exist within SBEM as each zone may have its own set of characteristics. RdSAP assumes all rooms are of the same makeup within the same building part. If there are any *point-altering* differences between rooms, they will need to be sectioned off into a new extension. The differences may include ceiling height, floor treatment, ceiling/roof treatment and wall styles.

Lighting

Within RdSAP lighting tends to be either high or low energy usage. SBEM allows for a variety of 11 different types of lamps or bulbs. Additionally, it is possible to specify some design details. What is confusing is the situation where a zone has several different types all within the same

zone. Convention has it that the zone should then be split in proportion to which type of light is providing how much light. It would be beneficial to be able to have mixed lighting within a zone.

Ventilation & Exhaust

Good air quality has been increasingly recognized as an important factor in building efficiency and quality. Good air quality is beneficial to health and also can reduce dampness in the building fabric.

Building air tightness is becoming increasingly important. Having an air-tightness test is required for domestic new builds (SAP reports) and will soon be looked at for existing domestic properties. At this time there is nowhere to input the test result figures into either RdSAP or SBEM. But this is coming.

Having good air tightness is a good thing if it is accompanied by a good flow of fresh air. Within RdSAP It is possible to specify extractors or supply/extract systems on a whole house basis.

Within SBEM it is possible to specify any number of individual systems being either simply extractors, or supply/extract. Additionally, they may be specified with heat recovery. These systems may be used zone by zone with each zone possibly having its own unique system. Thus, SBEM offers full flexibility in this area.

Renewables

Both RdSAP and SBEM allow for the capture of details of PV and wind turbines. Both systems accept much the same pieces of data; power, location, orientation, shading etc.
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