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BRE Client Report

Impact of SAP Rating on EESSH Reporting

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Executive Summary

The Energy Efficiency Standard for Social Housing (EESSH) is used to set minimum levels of the Energy Efficiency (EE) rating of dwellings.

At present the minimum levels apply to ratings calculated using SAP 2009.

SAP 2012 has now replaced SAP 2009 as the assessment method for rating dwellings.

Using data for some 47,000 dwellings located in Scotland, the relationship between results from SAP 2009 and SAP 2012 has been investigated. The following table provides pass levels for EESSH for calculations by both SAP 2009 and SAP 2012.

Minimum SAP ratings to pass the EESSH

	EE Rating (SAP 2009)		EE Rating (SAP 2012)	
Dwelling type	**Gas**	**Electric**	**Gas**	**Electric**
Flats	69	65	69	63
Four-in-a-block	65	65	65	62
Houses (other than detached)	69	65	69	62
Detached	60	60	60	57

The values for SAP 2009 and SAP 2012 provide on average the same energy efficiency standards and are within ±2 SAP points for the large majority of properties. However, in some cases the difference can be somewhat larger.

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1 Introduction

The Energy Efficiency Standard for Social Housing (EESSH), developed to help improve the energy efficiency of the social housing stock in Scotland, sets minimum values of energy efficiency expressed in terms of the SAP rating of the dwelling[1]. Up to now the ratings have been those calculated by SAP 2009 and the standard to be attained depends on dwelling type and main heating fuel and according to Table 1.

Table 1 : Minimum SAP ratings to pass the EESSH (SAP 2009)

	EE Rating (SAP 2009)	
Dwelling type	**Gas**	**Electric**
Flats	69	65
Four-in-a-block	65	65
Houses (other than detached)	69	65
Detached	60	60

SAP ratings are now being assessed using SAP 2012 (version 9.92). A given property may result in a different rating via a SAP 2009 compared with that via a SAP 2012 assessment. This can arise for technical reasons if there is, for example, a change in the method of treatment of building types or technology types between the two SAP versions. More significantly in the present context, different ratings can arise because of changes in fuel prices. The SAP rating of a property is based on the annual cost of providing heating, hot water, ventilation and lighting. Whenever a new SAP version is created, the fuel prices are updated and the algorithm for generating the rating is amended so that on average, i.e. over all dwelling types and all fuel types, there is no change to the SAP rating.

[1] Rating defined by the Government's Standard Assessment for Energy Rating of Dwellings. See references 1 and 2.

However, when considering particular dwelling types and particular heating fuels (as is needed for the EESSH) differences can arise. Comparing the fuel prices used in SAP 2009 and SAP 2012, the price of electricity rose substantially more than the price of gas leading to a different relationship for electricity compared with gas.

Accordingly a table equivalent to Table 1 above is required, giving ratings by SAP 2012 that correspond to the same energy efficiency standard.

2 Data set

The analysis in this report is based on data originally collected for the purpose of generating Energy Performance Certificates. Data for 92,516 dwellings located in Scotland was obtained from NES (National Energy Services Ltd, an approved energy rating company). NES also provided the SAP rating according to SAP 2009 and the SAP rating according to SAP 2012, for each property.

The data for each property included[2]:

- Tenure (owner occupied, social rental, private rental)
- Property type (house, bungalow, flat, maisonette)
- Built form (detached, semi-detached, terraced)
- Main heating fuel
- 9.91 SAP rating (SAP 2009)
- 9.92 SAP rating (SAP 2012)
- For flats:
  - Flat position (basement, ground floor, mid-floor, top floor)
  - Flat level (ground floor, 1st floor, 2nd floor, etc)
  - Inclusion of another flat with the same postcode (to identify 4-in-the-block)

The data used for the analysis consisted of those properties designated as social rental and whose main heating fuel is mains gas or electricity (about half the total number).

The data were then divided into the four categories used by the EESSH:

- Detached houses
- Houses other than detached
- Four-in-a-block flats
- Flats other than four in a block

For present purposes, 'houses' includes houses and bungalows, and 'flats' includes flats and maisonettes.

[2] The data also included these items (not used in the analysis):
- Transaction type
- SAP region
- Age band
- 9.91 EI rating (SAP 2009)
- 9.92 EI rating (SAP 2012)
- Date of assessment
- Floor area
- Second main heating fuel
- Secondary heating fuel
- Water heating fuel

The separation into detached houses, not detached houses and flats comes directly from the collected data, but dividing the flats into 4-in-a-block flats and other flats is less straightforward. The upper flats of a 4-in-a block are readily identified as being semi-detached, top floor and on level 1. However for ground floor flats, semi-detached and ground floor does not indicate whether it is the lower flat of a 4-in-a block or another flat type. The approach adopted was to designate ground-floor semi-detached flats as being lower flats of 4-in-a-block if their postcode matched one of the 4-in-a-block upper flats already identified. This will not be prefect but, as shown later, the relationship between SAP 2009 ratings and SAP 2012 ratings is similar for all the dwelling categories and it is considered unlikely that a significant error is introduced.

The numbers of each dwelling types used for the analysis are as follows:

Table 2 : Number of each dwelling type

	Number of dwellings	
Dwelling type	**Gas**	**Electric**
Flats	17,723	8,118
Four-in-a-block	2,909	618
Houses (other than detached)	13,790	3,677
Detached	286	136

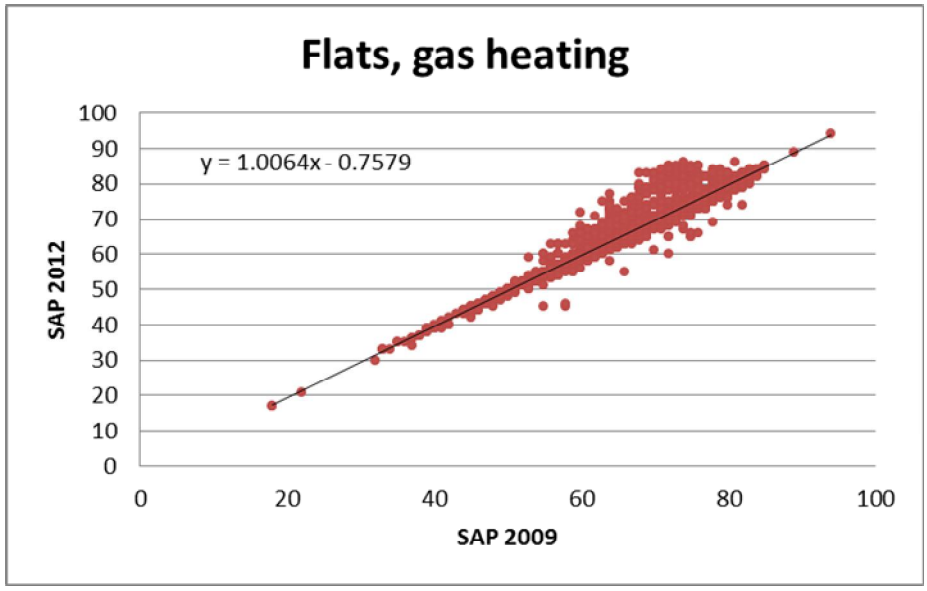
3 Analysis

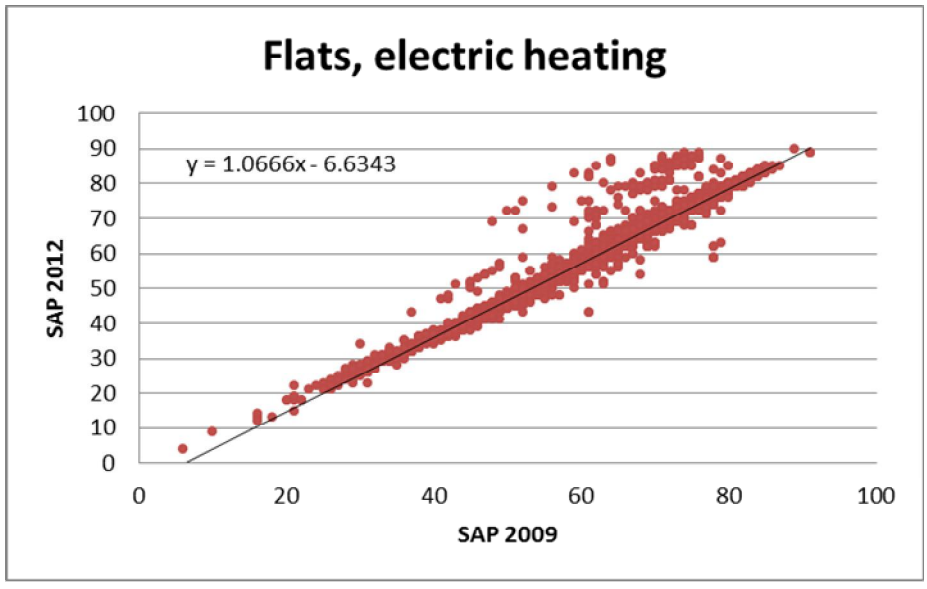
3.1 Relationship between SAP 2009 and SAP 2012 rating

For each of the eight categories (four dwelling types and two fuels for each) graphs were constructed showing the SAP 2012 rating plotted against the SAP 2009 Rating for each property.

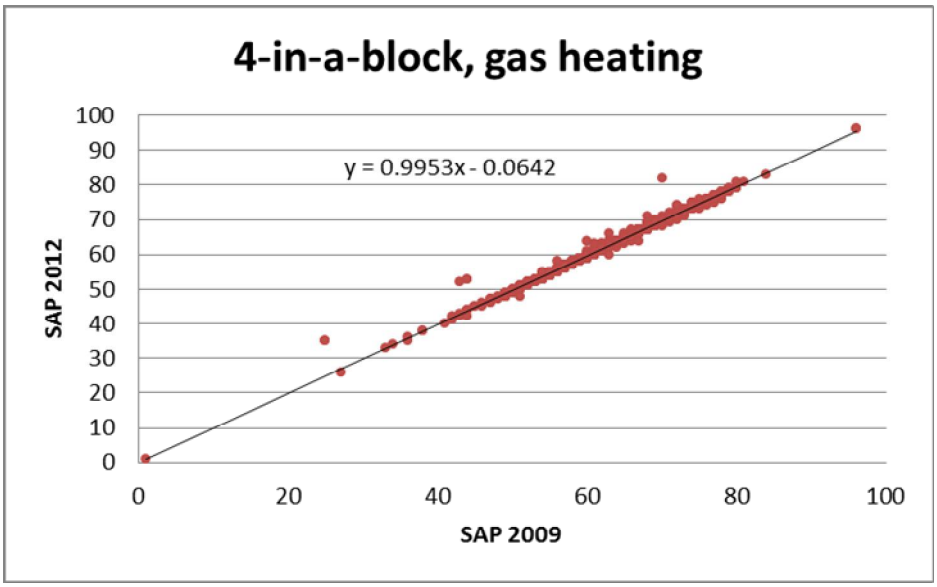
The relationship defined by the trend line is shown on each graph.

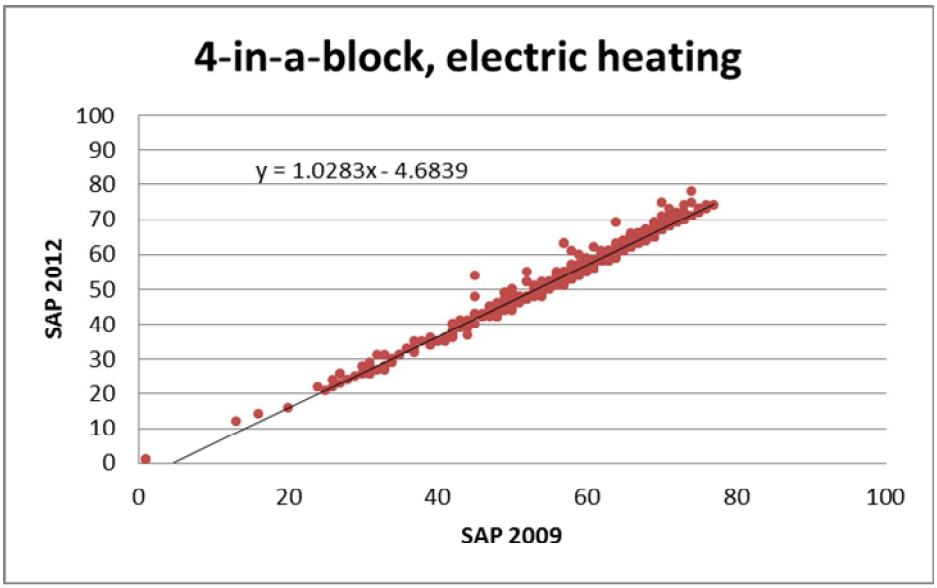
3.1.1 Flats



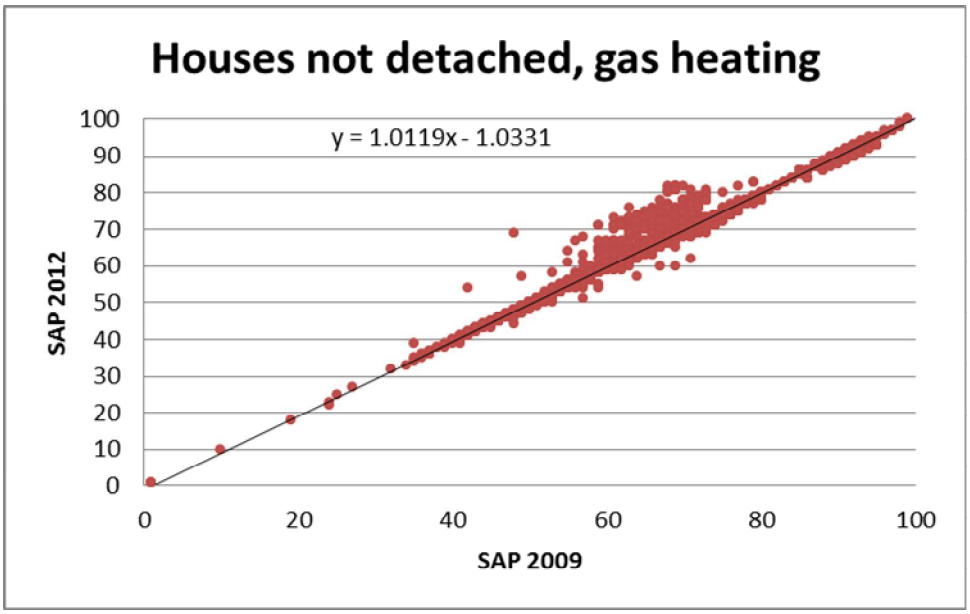


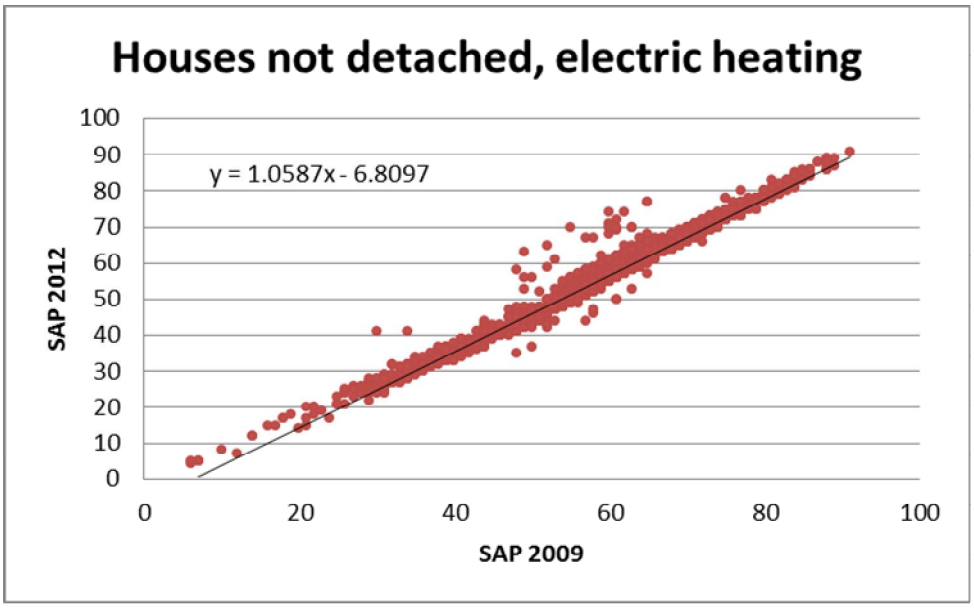
3.1.2 Four-in-a-Block



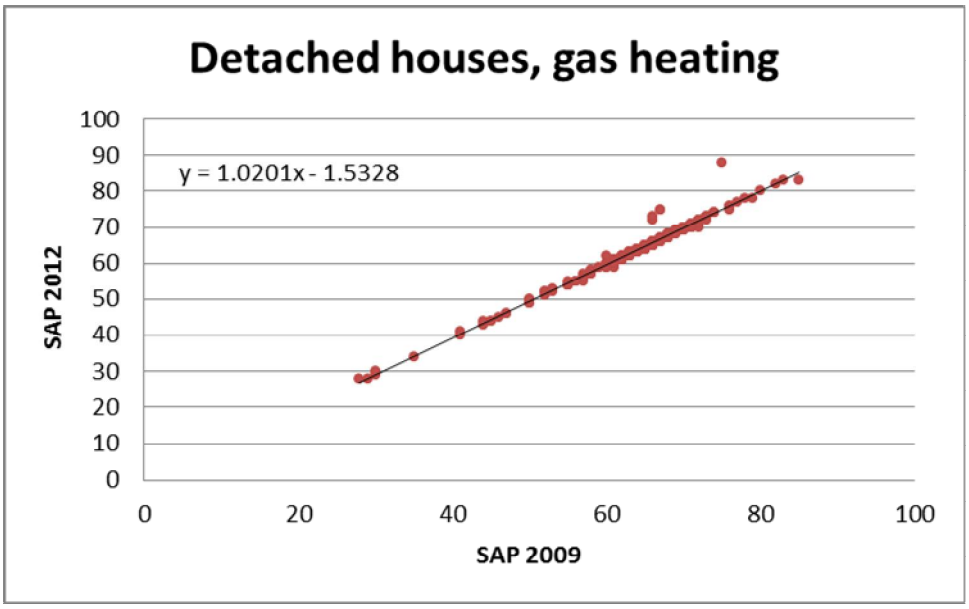


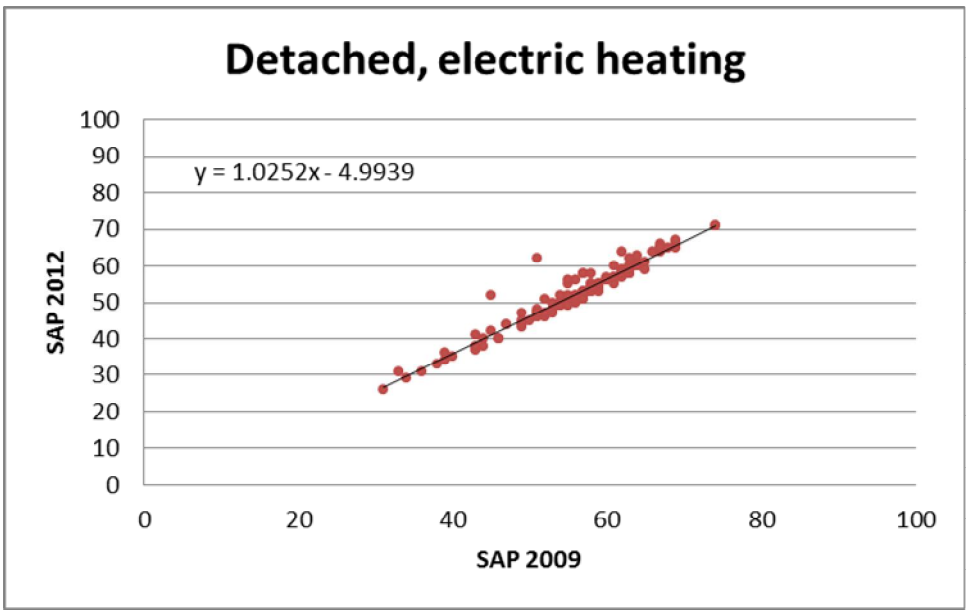
3.1.3 Houses other than detached





3.1.4 Detached houses





3.2 Accuracy of the conversion

The ratings are converted accurately for those dwellings which lie on the trend line in the graphs shown in the preceding section of this report, since the trend lines are used as the basis of conversion.

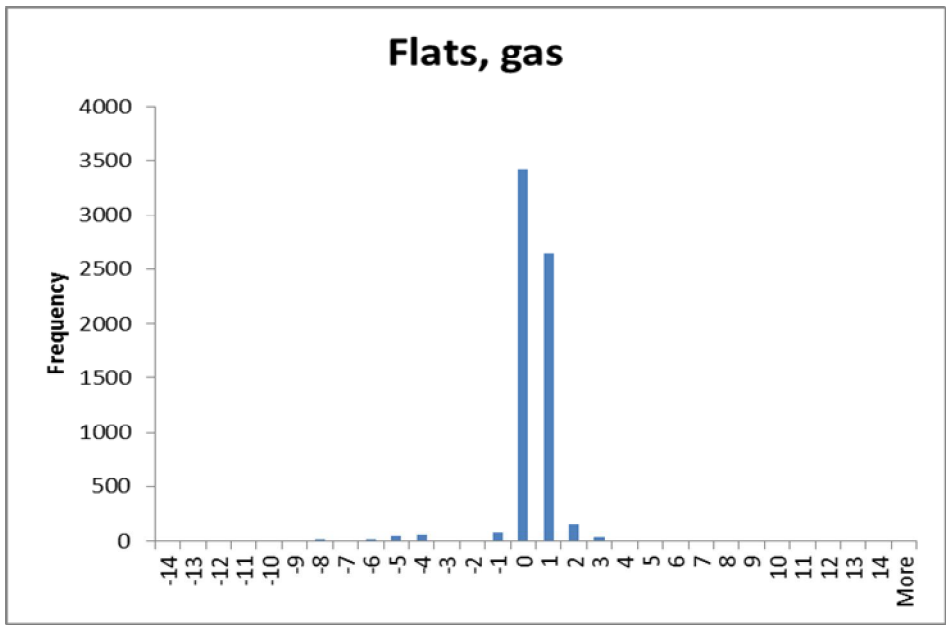
While most dwellings are close to the trend line, there are some which lie significantly off the line. To quantify this, a comparison was made between the ratings calculated by SAP 2009 and converted, and the rating calculated directly by SAP 2012. For this, the dwellings with SAP 2009 ratings between 60 and 70 were used, that being the range of interest for EESSH.

Each of the charts following shows the difference between the rating converted from SAP 2009 and the rating calculated by SAP 2012. The horizontal axis is the difference; the vertical axis is the number of dwellings for each difference.

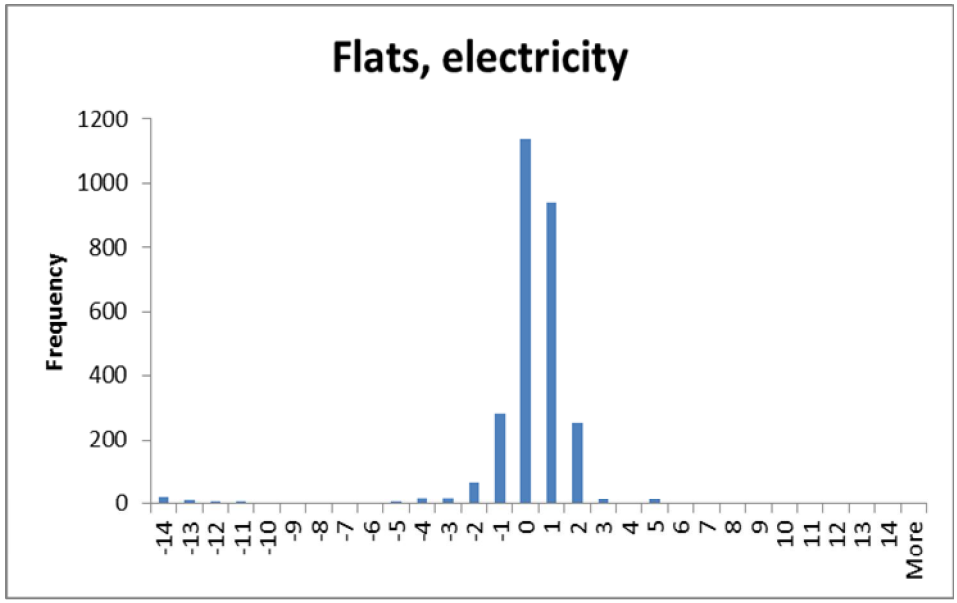
Generally the conversion works well for the large majority of cases, especially for gas heating. There are more differences for dwellings using electricity for main heating; one reason is likely to be that electrically heated dwellings more often use another fuel e.g. for secondary space heating or for water heating, which is not taken into account in the conversion.

If EESSH proceeds with the simple table proposed for setting the pass level for SAP 2012, landlords need to be aware that a different result can be obtained in some cases if the property is subsequently re-assessed using SAP 2012.

3.2.1 Flats

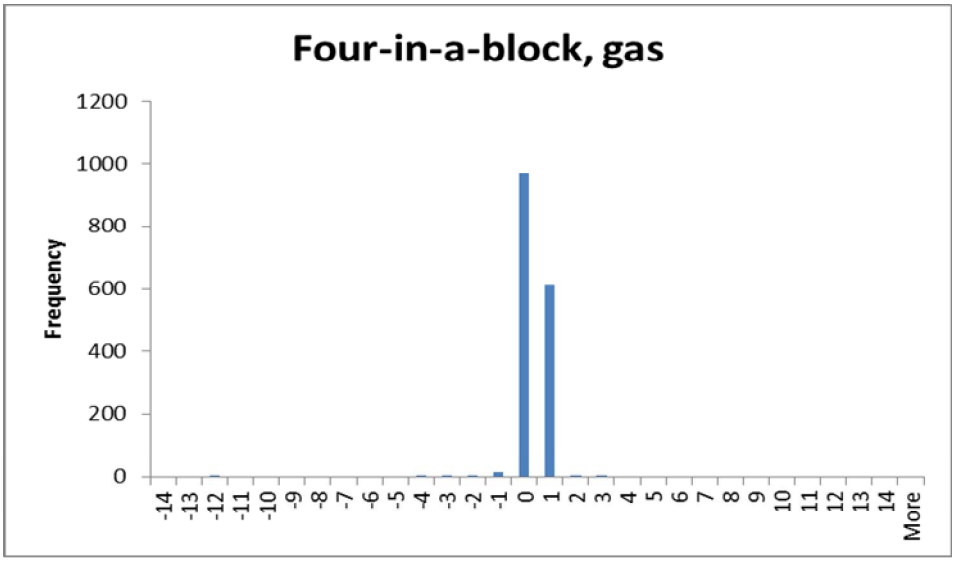


For gas heated flats, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 94% of cases; ±2 covers 97% of cases.

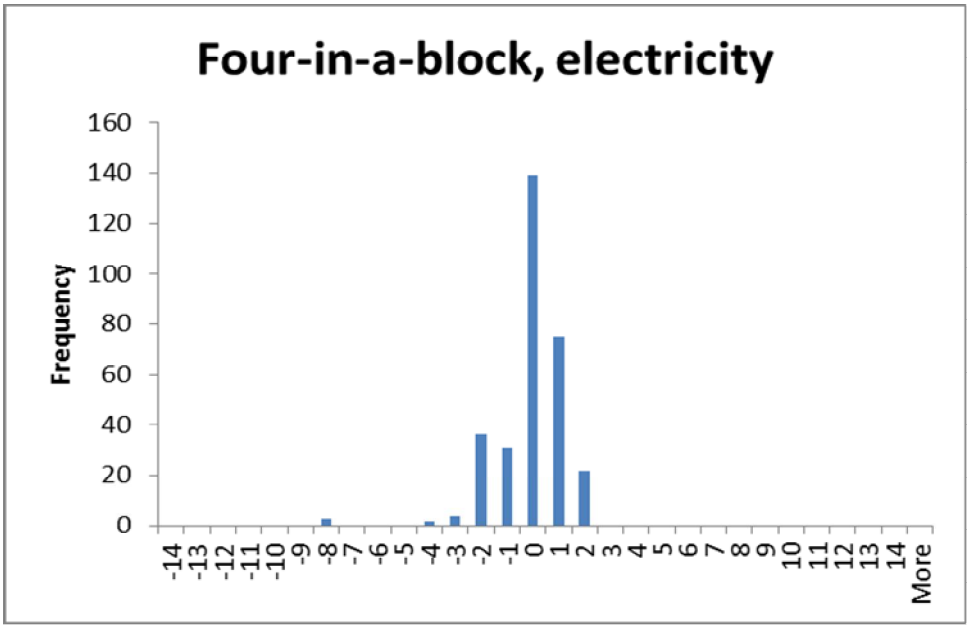


For electrically heated flats, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 84% of cases; ±2 covers 95% of cases.

3.2.2 Four-in-a-block

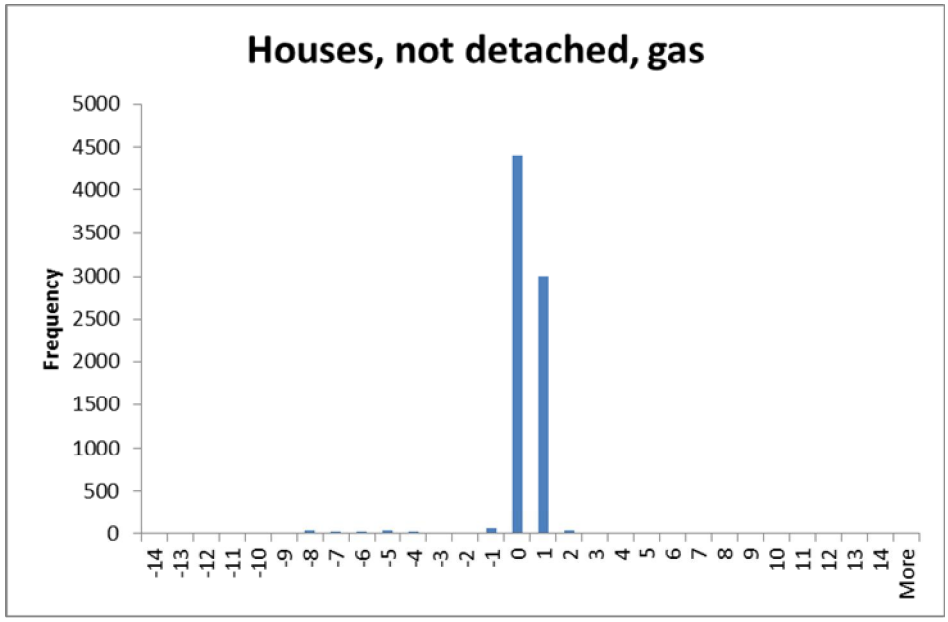


For gas heated four-in-a-block, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 99% of cases; ±2 covers 100% of cases.

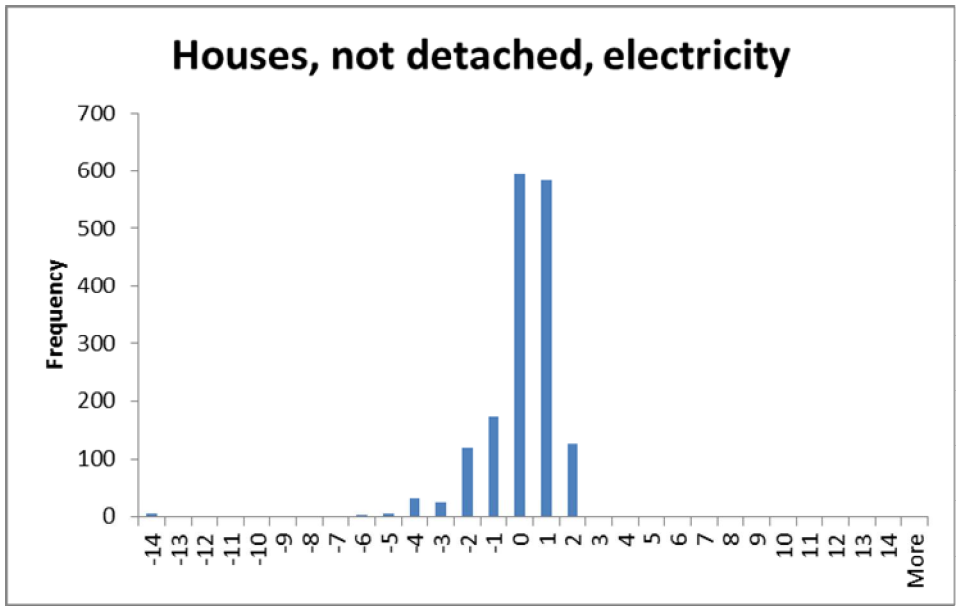


For electrically heated four-in-a-block the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 79% of cases; ±2 covers 97% of cases.

3.2.3 Houses other than detached

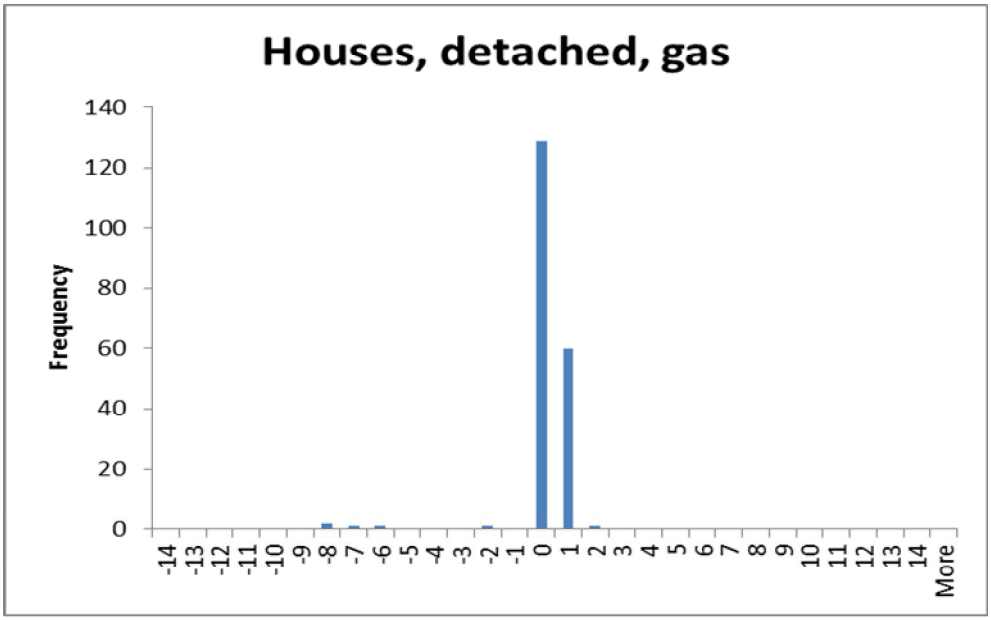


For gas heated houses other than detached, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 covers 97% of cases; ±2 also covers 97% of cases.

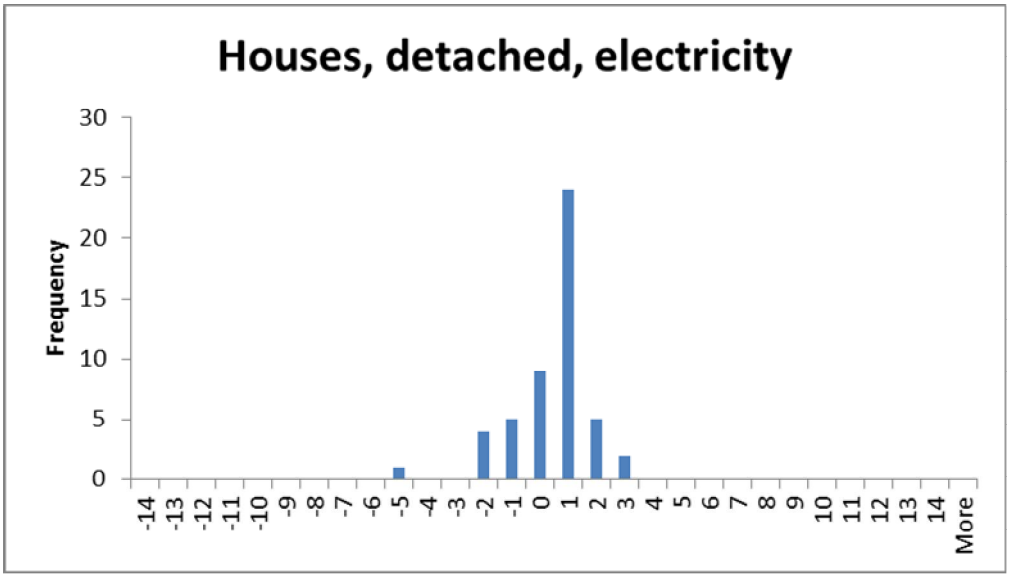


For electrically heated houses other than detached, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 81% of cases; ±2 covers 95% of cases.

3.2.4 Detached houses



For gas heated detached houses, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 97% of cases; ±2 covers 98% of cases.



For electrically heated detached houses, the difference between the directly calculated results and the results obtained via the conversion formula shows that ±1 SAP point covers 76% of cases; ±2 covers 94% of cases.

3.2.5 Summary

Table 3 shows the summary of the statistical analysis, showing the percentage with ±1 SAP point and within ±2 SAP points.

Table 3 : Accuracy of conversion

	±1 SAP point		±2 SAP points	
Dwelling type	**Gas**	**Electric**	**Gas**	**Electric**
Flats	94%	84%	97%	95%
Four-in-a-block	99%	79%	100%	97%
Houses (other than detached)	97%	81%	97%	95%
Detached	97%	76%	98%	94%

4 Conclusion and recommendations

On the basis of the statistical analysis described in this report, the EESSH pass levels that presently apply to ratings calculated by SAP 2009 can be extended to include also ratings calculated by SAP 2012, as shown in Table 4.

Table 4 : Minimum SAP ratings to pass the EESSH (SAP 2009 and SAP 2012)

	EE Rating (SAP 2009)		EE Rating (SAP 2012)	
Dwelling type	**Gas**	**Electric**	**Gas**	**Electric**
Flats	69	65	69	63
Four-in-a-block	65	65	65	62
Houses (other than detached)	69	65	69	62
Detached	60	60	60	57

The analysis has also indicated the accuracy of conversion process in terms of the ratings being accurate to with ±1 SAP point and ±2 SAP points.

References

1. The Government's Standard Assessment Procedure for Energy Rating of Dwellings 2009 edition

2. The Government's Standard Assessment Procedure for Energy Rating of Dwellings 2012 edition

3. http://energyefficientsocialhousing.org