



Department  
of Energy &  
Climate Change

# Fuel Poverty Energy Efficiency Rating Methodology

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## Introduction

1. In England a household is defined as being in fuel poverty if it is on a low income and faces high energy costs.<sup>1</sup> Through the amendment of the Warm Homes and Energy Conservation Act in 2013, Government committed to putting in place a new and long term target for fuel poverty in England.
2. In publishing the Fuel Poverty Strategic Framework<sup>2</sup> in July 2013, Government made clear its intention to set a new target on the basis of improving the energy efficiency standards of fuel poor homes. This methodology document sets out in detail how to measure energy efficiency for that purpose.
3. The methodology set out in this document is based primarily on the Government's Standard Assessment Procedure (SAP) for assessing the energy performance of domestic properties.<sup>3</sup> Building on SAP, the Fuel Poverty Energy Efficiency Rating Methodology also accounts for the impact of policy interventions that directly affect household energy costs. In the same way as SAP, the methodology generates an energy efficiency rating from 0 (lowest) to 100 (highest). This rating is then translated into an energy efficiency 'Band' from G (lowest) to A (highest), in a way that is analogous to a SAP rating being used to generate an overall energy efficiency Band (again from G to A) for Energy Performance Certificates.<sup>4</sup>
4. This methodology is intended only for use in measuring the energy efficiency of fuel poor households in relation to a new fuel poverty target for England. It will be applied solely to the housing survey data used for compiling and preparing the Annual Fuel Poverty National Statistics Report.<sup>5</sup> The results will be published as part of that report alongside both the number of households in fuel poverty and the fuel poverty gap.<sup>6</sup> It is not the intention for this methodology to either be used as a delivery tool, or to provide an alternative version of SAP.

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<sup>1</sup> For more detail on the definition see the Government response to the 2013 consultation on changing the framework for measurement of fuel poverty, available at: <https://www.gov.uk/government/consultations/fuel-poverty-changing-the-framework-for-measurement>

<sup>2</sup> Published in July 2013. Available at: <https://www.gov.uk/government/publications/fuel-poverty-a-framework-for-future-action>

<sup>3</sup> The 2012 edition of SAP is used, version 9.92. For more information see the SAP 2012 see: <http://www.bre.co.uk/sap2012/>

<sup>4</sup> For more detail on Energy Performance Certificates see: <https://www.gov.uk/government/policies/improving-the-energy-efficiency-of-buildings-and-using-planning-to-protect-the-environment/supporting-pages/energy-performance-of-buildings>

<sup>5</sup> Currently the English Housing Survey.

<sup>6</sup> For the latest published Fuel Poverty National Statistics Report see: <https://www.gov.uk/government/collections/fuel-poverty-statistics>

5. The sections that follow set out:
- the Fuel Poverty Energy Efficiency Rating Methodology and the ways in which it is similar to SAP;
  - how adjustments are made to account for direct energy cost interventions;
  - how the methodology should be applied and the appropriate data sources to be used; and
  - future updates.

# The Fuel Poverty Energy Efficiency Rating Methodology

## Overview

6. The Fuel Poverty Energy Efficiency Rating Methodology is predominantly based on the Government's Standard Assessment Procedure (SAP) that measures the energy performance of domestic properties. In practice this means that in assessing the energy performance of the building fabric, heating system and lighting of homes surveyed for fuel poverty analysis, the methodology is wholly based on the 2012 edition of SAP, as set out in Version 9.92.<sup>7</sup>
7. Adopting SAP as the core of the methodology demonstrates Government's belief that energy efficiency will always be at the heart of tackling fuel poverty. This is why it is at the core of how progress will be measured against a long term target.
8. The 2013 Fuel Poverty Strategic Framework<sup>8</sup> set out that in addition to physical improvements to the energy performance of the home, there are further cost-effective ways to help to improve the standard of fuel poor homes or assist in managing energy costs in the long term. Government believes that measurement of progress against a fuel poverty target should also reflect the progress made through the full range of policies. As a result, this methodology builds on SAP by accounting for policies that directly affect the cost of energy – at present this relates to the Warm Home Discount and Government Electricity Rebate.

## Core methodology

9. SAP is the Government's official methodology for assessing the energy performance of dwellings. It is used to perform a range of important functions, including mapping performance against an A to G banding scale, as shown on Energy Performance Certificates. A detailed description of the version of SAP adopted for this Fuel Poverty Energy Efficiency Rating Methodology can be found in **version 9.92 of the SAP 2012 edition document**. In this section we provide a stylized summary, which is also illustrated in Figure 1.
10. The SAP methodology details an approach to calculating how much energy is required to meet a standardised heating regime (e.g. heating the home for 2 hours in the morning and 7 hours in the evening on weekdays) to achieve prescribed indoor temperatures (e.g. 21°C in the main living area and 18°C elsewhere) in the dwelling being assessed. In addition, standardised assumptions are used about the amount of lighting required. A range of factors are included in the calculation, including the consideration of:
  - The building materials used to construct the dwelling;

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<sup>7</sup> For more detail see: <http://www.bre.co.uk/sap2012/>. Documentation for version 9.92 is available here: [http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012\\_9-92.pdf](http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf)

<sup>8</sup> Published in July 2013. Available at: <https://www.gov.uk/government/publications/fuel-poverty-a-framework-for-future-action>

- The extent to which the building fabric has been insulated (e.g. whether the dwelling has loft and/or wall insulation);
  - How well ventilated the building is;
  - The degree to which solar gains affect energy requirements;
  - The efficiency of and degree of control over the dwelling’s heating system;
  - The extent to which energy may be required to cool the home;
  - The type of fuel(s) used to heat, cool, light and (where applicable) ventilate the home; and
  - The presence of any renewable energy technologies.
11. The SAP methodology produces modelled estimates of the amount of energy required for space heating (and cooling), water heating and lighting respectively, less the energy generated from the presence of renewable energy technologies such as solar panels. Such estimates are based on standardised assumptions for occupancy and behaviour.
12. Fixed individual fuel prices are then applied to generate estimates of the costs of heating, cooling and lighting. The dwelling’s estimated costs are then adjusted for floor area, enabling straight forward comparisons of efficiency across different sizes of dwelling. This is then expressed on a fuel cost-based scale from 1 to 100, with 1 representing very inefficient dwellings (essentially homes with high energy costs) and 100 representing very efficient dwellings (low running costs).

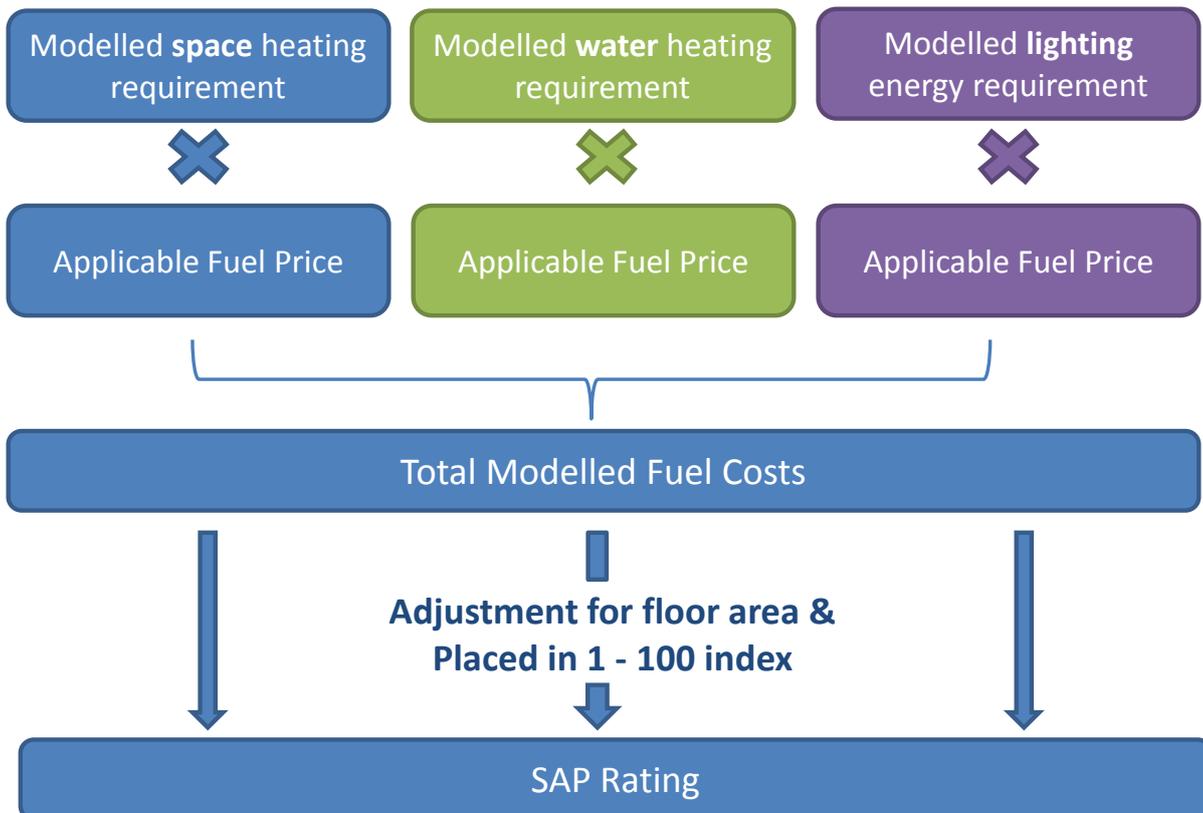


Figure 1: Stylized representation of SAP rating calculation<sup>9</sup>

<sup>9</sup> SAP also accounts for the energy costs (where applicable) of ventilation. This is not shown in Figure 1 for simplicity.

13. The SAP rating's use of energy *costs* rather than just simply units of energy means that not only does it capture differences between dwellings based the thermal efficiency of the building fabric, but also captures the effect of differences in prices between alternative heating fuels. This would mean, for example, that in the case of two dwellings that were identical in all respects save that one used electricity (typically a more expensive fuel) and the other used mains gas (typically the least cost heating fuel) the gas-heated home would be assigned a higher SAP rating.

## Accounting for direct energy cost interventions

14. Basing the core of the Fuel Poverty Energy Efficiency Rating Methodology on SAP sets the right policy incentives for addressing the physical drivers of required energy costs, but does not account for other forms of support that directly address the cost of energy. The main contemporary policy example is the Warm Home Discount, which delivers support to over 2 million households per year, mainly in the form of direct monetary discounts on the electricity bills of low income households in or at risk of fuel poverty.

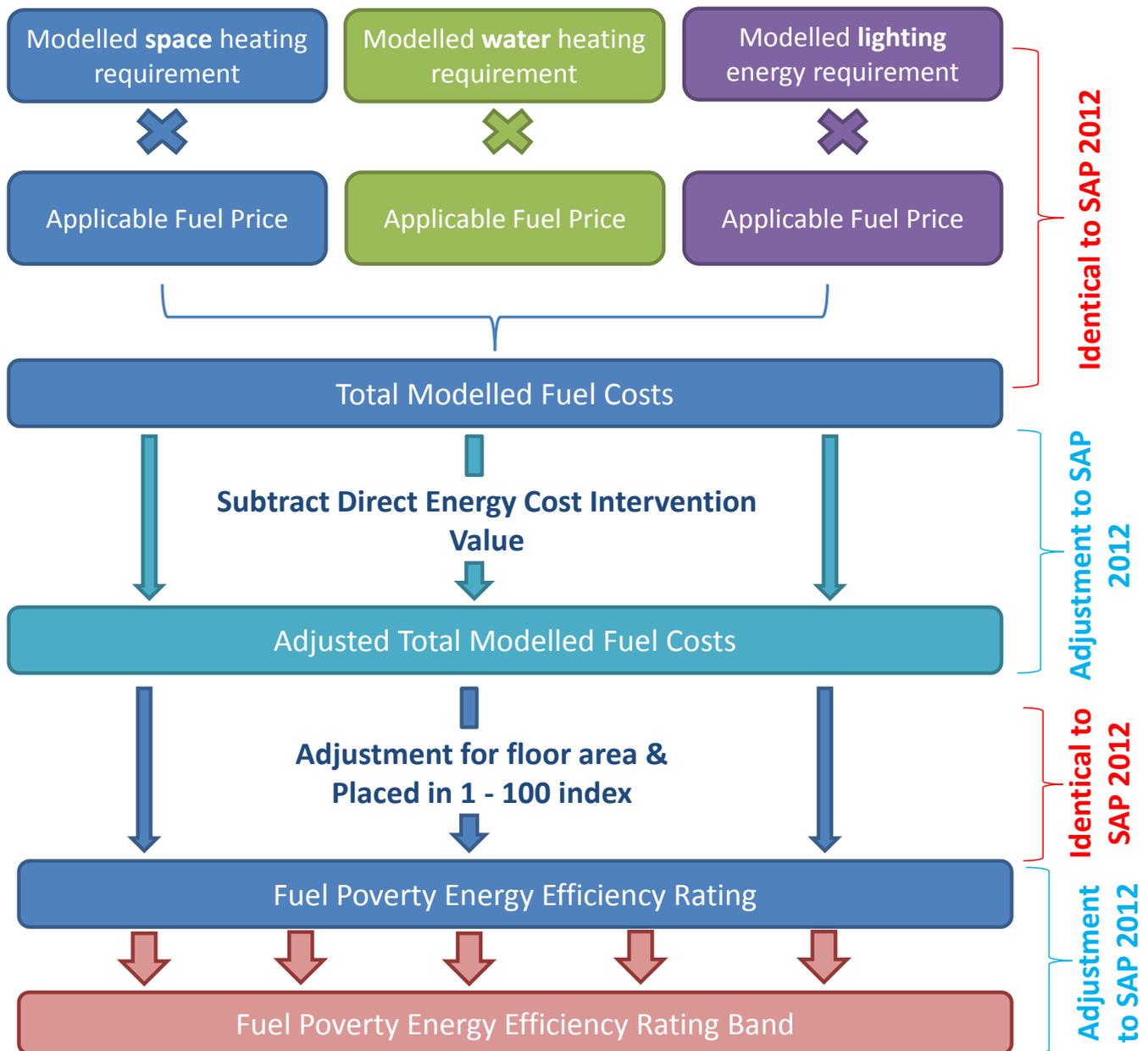


Figure 2: Stylized representation of Fuel Poverty Energy Efficiency Rating Methodology<sup>10</sup>

15. Accounting for direct energy cost interventions in this methodology is conceptually straightforward, because (like SAP) the methodology produces energy cost estimates ('Total Modelled Fuel Costs') before translating those costs into a rating (see Figure 2).
16. At the stage where 'Total Modelled Fuel Costs' are calculated (the equivalents in SAP 2012 version 9.92 are SAP Worksheet calculations 255 and 355<sup>11</sup>), direct energy cost interventions such as energy bill rebates can be deducted. This generates 'Adjusted Total Modelled Fuel Costs' (Figure 2).
17. The 'Adjusted Total Modelled Fuel Costs' are then adjusted for floor area and placed in an index from 1 to 100 (these steps are analogous to SAP Worksheet calculations 256 to

<sup>10</sup> Like SAP, the Fuel Poverty Energy Efficiency Rating Methodology accounts for (where applicable) the cost of ventilation. As in Figure 1, Figure 2 does not show these costs for simplicity.

<sup>11</sup> SAP 2012, Version 9.92. Available at: [http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012\\_9-92.pdf](http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf)

258 and 356 to 358 in SAP 2012 version 9.92). This creates a 'Fuel Poverty Energy Efficiency Rating' (Figure 2) which can be then translated into a Band (from A to G), as set out in Table 1 below.

### Ensuring consistency of price bases

18. The energy prices used to generate 'Total Modelled Fuel Costs' (Figure 2) are fixed, and listed in Table 12 of the SAP 2012 Version 9.92 document.<sup>12</sup> This means that 'Total Modelled Fuel Costs' are always expressed in prices consistent with SAP 2012 Version 9.92. Calculating 'Adjusted Total Modelled Fuel Costs' therefore requires any direct energy cost intervention to be expressed in the same price base. The value of a direct energy cost intervention (for example a Warm Home Discount rebate was worth £135 in cash terms in 2013/14) is typically expressed in nominal terms, therefore requiring adjustment in order to avoid overstating their impact.
19. To ensure that adjustments are made in a way consistent with how fuel costs are modelled, for an energy cost intervention taking place in time period  $t$ , the formula in *Equation 1* should be used to calculate the value of the direct energy cost intervention:

$$Value_{2012} = Value_t \times \left( \frac{CPI_{2012}}{CPI_t} \right) \quad \text{Equation (1)}$$

Where:

$Value_{2012}$  = the value of the intervention on a consistent price base with SAP 2012 modelled fuel costs

$Value_t$  = the value of the intervention in nominal terms for the time period being analysed

$CPI_{2012}$  = the domestic fuel component of the Consumer Prices Index for the time period corresponding to the fuel prices applied in SAP2012 version 9.92

$CPI_t$  = the domestic fuel component of the Consumer Prices Index for the full year or relevant point in the time period being analysed

### Policies to be reflected using this approach

20. Adjustments to account for direct energy cost interventions should only be applied for those policies which lower required energy costs directly – namely **Warm Home Discount**<sup>13</sup> and the **Government Electricity Rebate**.<sup>14</sup>
21. Government considers that this is the appropriate approach to take for current and planned policies. However, it is possible that over the period of the target, changes might occur, for example with regards the mechanism for compensating households in relation to energy costs. In these circumstances, it would be important to confirm that changes in the Fuel Poverty Energy Efficiency Rating reflected the underlying impact of the change

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<sup>12</sup> Available at: [http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012\\_9-92.pdf](http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf)

<sup>13</sup> For detail on the current Warm Home Discount scheme see: <https://www.gov.uk/the-warm-home-discount-scheme/overview>

<sup>14</sup> For detail on the Government Electricity Rebate see: <https://www.gov.uk/government/consultations/government-electricity-rebate>

on the situation of households in fuel poverty, and consider any adjustment necessary as part of systematic review of the methodology (see section on Future Updates below).

## Application of the methodology, data and inputs

22. The Fuel Poverty Energy Efficiency Rating Methodology is intended for the measurement and monitoring of progress against a fuel poverty target, and this will be reported alongside the number of households in fuel poverty and the fuel poverty gap in the Annual Fuel Poverty National Statistics Report.<sup>15</sup>
23. This means that the methodology should only be applied as part of the preparation of analysis for that annual report, or related policy analysis. It also means that the housing survey data required in order to apply the methodology should be the same as that used for the purposes of compiling and analysing fuel poverty National Statistics.<sup>16</sup>
24. The methodology requires data inputs that should as far as possible be directly observed from the housing survey data used for fuel poverty National Statistics. Where observed inputs are not present, choices of assumptions must be made. For the purposes of applying the Fuel Poverty Energy Efficiency Rating Methodology, in circumstances where inputs cannot be observed or reasonably derived from the housing survey data, default input values referenced in Reduced Data SAP (rdSAP) Version 9.92 (or the version of rdSAP relevant to the time period being reported) should be used.<sup>17</sup>
25. The energy prices used in the Fuel Poverty Energy Efficiency Rating Methodology should all be drawn from Table 12 of SAP 2012 Version 9.92.
26. The ratings thresholds used to determine the Bands (A to G) should be those listed in Table 14 of SAP 2012 Version 9.92 (reproduced in Table 1).

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<sup>15</sup> For the latest published Fuel Poverty National Statistics Report see: <https://www.gov.uk/government/collections/fuel-poverty-statistics>

<sup>16</sup> This is currently the English Housing Survey.

<sup>17</sup> Available in Appendix S of the SAP 2012 9.92 publication: [http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012\\_9-92.pdf](http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf)

**Table 1: Fuel Poverty Energy Efficiency Rating Bands**

<b>Fuel Poverty Energy Efficiency Rating</b>	<b>Band</b>
1 to 20	G
21 to 38	F
39 to 54	E
55 to 68	D
69 to 80	C
81 to 91	B
92 or more	A

27. Where direct energy cost interventions are accounted for in the methodology relating to Warm Home Discount rebates or the Government Electricity Rebate, the nominal values of the rebates in any particular year should be drawn directly from the appropriate published scheme regulations. Where this is not possible, a published alternative (such as an Impact Assessment or Government consultation response) should be used.
28. Where the housing survey data used for compiling fuel poverty National Statistics does not identify which households receive direct energy cost interventions, the same approach to modelling receipt should be used as for the purposes of generating fuel poverty National Statistics.
29. The Domestic Fuel Component of the Consumer Prices Index should be sourced from the Office for National Statistics (directly or indirectly).

## Future updates

30. There will be systematic points at which it would be beneficial to review the methodology set out in this document. These may include:
  - Each time a new edition of the SAP methodology is implemented. As the Fuel Poverty Energy Efficiency Rating Methodology is primarily based on SAP 2012, and the fuel poverty target will be long term, it would be beneficial to consider each time a new edition of SAP implemented as to whether it would be appropriate to make corresponding or other changes.
  - Should there be changes in the fuel poverty policy landscape in relation to energy cost interventions it would be appropriate to consider whether the changes or additions are in scope for inclusion in the Fuel Poverty Energy Efficiency Rating Methodology.
31. There may also be other circumstances which would make it appropriate to review the methodology, and Government will make those judgements in due course.
32. In the event of updates to this methodology, an amendment to the relevant regulations made pursuant to Section 1A of the Warm Homes and Energy Conservation Act 2000 will be prepared.

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