



Methodology Note accompanying statistical releases on estimates of home insulation levels in Great Britain.

This note summarises the methodology used to produce estimates of the number of homes in Great Britain (GB) with cavity wall, loft and solid wall insulation¹. It is intended to help users understand the assumptions made in the compilation of these statistics and some of the limitations of the data sources.

Currently these data are considered to be Experimental Statistics; which means they are official statistics still in development, prior to undergoing an evaluation process to be assessed as National Statistics. They are published in order to involve users and stakeholders in their development, and as a means to build in quality assurance at an early stage of development.

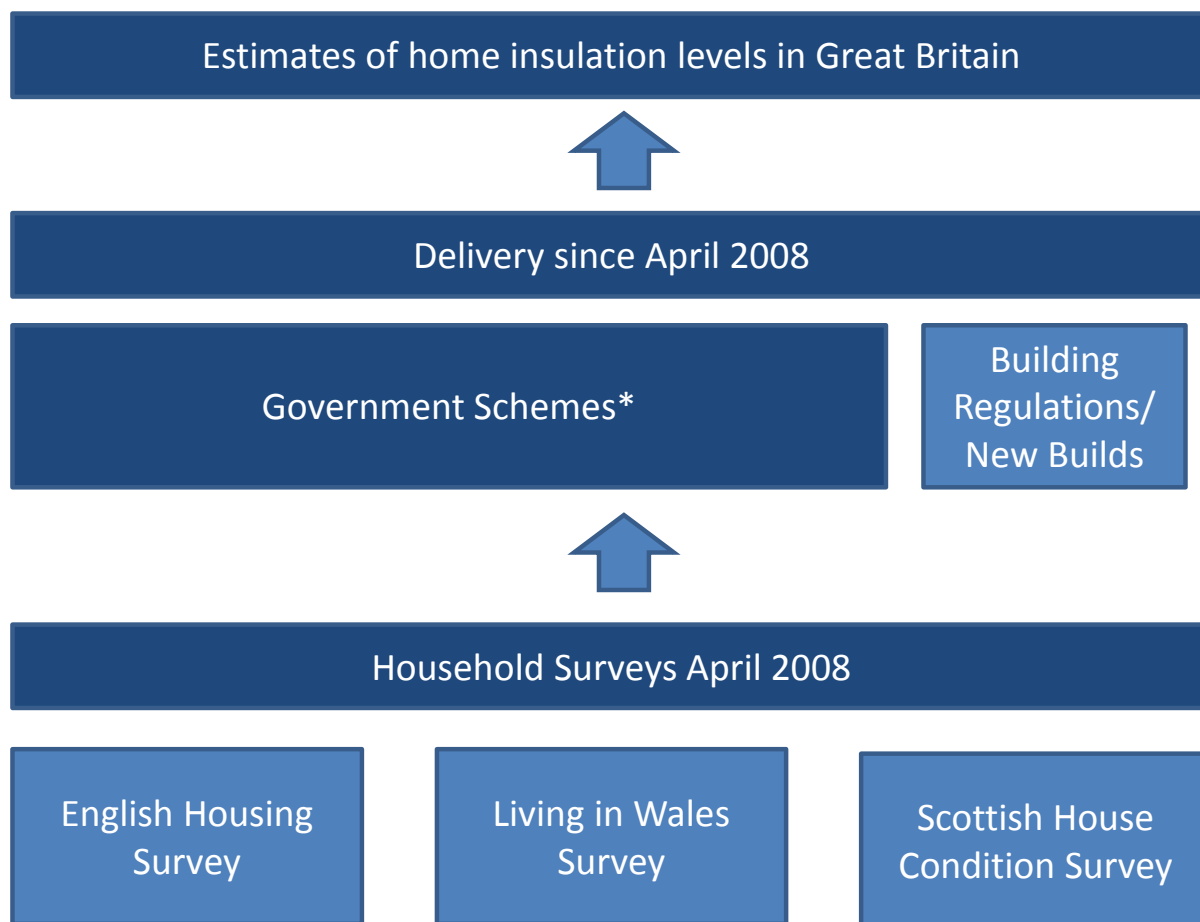
The estimates of insulation levels are based on figures reported for the previous quarter and therefore represent the position at the beginning of the following quarter. This note outlines how the estimates are calculated for each type of insulation, including how the baseline figures are constructed and how sources of increase in insulated levels are appended to the baseline figures. It also sets out future developments that are planned for this publication.

Summary of overall approach

Estimates of the number of properties with cavity wall and loft insulation use April 2008 housing survey data as a baseline. Installations of cavity wall insulation and loft insulation through Government schemes and the estimates of properties with insulation as a result of the building of new homes are then added to the April 2008 baseline on a quarterly basis. Estimates of solid wall insulation are based only on delivery of solid wall insulation through Government schemes (including the Energy Efficiency Commitment). Figure 1 below summarises how the estimates are constructed.

¹http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/en_effic_stats/home_ins_est/home_ins_est.aspx

Figure 1: Construction of estimates of home insulation levels in Great Britain



*This includes the Carbon Emissions Reduction Target (DIY and Professional), Community Energy Savings Programme and Warm Front between April 2008 and December 2012. It then includes delivery through the Green Deal and the Energy Company Obligation from January 2013.

2008 Baseline

Cavity wall insulation

Estimates of the number of properties with cavity wall insulation use April 2008 housing survey data as a baseline, this is used alongside information from building regulations and assumptions made for Reduced Data SAP² (RdSAP) calculations, to help categorise properties in the survey.

The section below gives a brief overview of each of the housing surveys from which the number of properties with cavity wall insulation is taken for each country within GB.

² Reduced Data SAP (RdSAP) has been developed for use in existing dwellings based on a site survey of the property, when the complete data set for a SAP calculation is not available, and will be used to inform recommendations for measures to be installed through the Green Deal, the full RdSAP methodology can be found here: http://www.bre.co.uk/filelibrary/accreditation/scheme_standards/SAP_2009_9-91_Appendix_S_January_2012.pdf.

English Housing Survey

The English Housing Survey (EHS)³ is an annual survey, commissioned by the Department for Communities and Local Government (DCLG). It covers all tenures and involves a physical inspection of properties by trained surveyors. The information obtained through the survey provides a picture of the type and condition of housing in England. It also collects information relating to the energy efficiency of a property, including insulation measures in the property. The survey is an un-clustered, random sample of properties in England. The EHS results reported are based on surveys for two combined financial years. The figures for 2007-08 and 2008-09 are referred to by the mid-point of April 2008. April 2008 results are based on a sample of 16,150 (occupied or vacant) dwellings. Figures from the EHS have been scaled up in this publication so that the total number of properties matches the total dwelling stock figures for England published by DCLG⁴.

Scottish House Condition Survey

The Scottish House Condition Survey (SHCS)⁵ is commissioned by the Scottish Government and, like the EHS, includes a survey of properties by trained surveyors. However, it does not include unoccupied dwellings. Figures from the SHCS have been scaled up so that the total number of properties matches the total dwelling stock figure for Scotland published by DCLG. This adjustment means that the estimates are for all properties in Scotland, whether occupied or unoccupied, assuming that there are no differences between occupied and vacant homes.

Living in Wales Survey

The Living in Wales (LiW) survey was an annual household survey conducted between 2004 and 2008, commissioned by the Welsh Assembly Government. In 2004 and 2008 it also included a property survey. Like the SHCS, the property survey was carried out by trained surveyors on occupied dwellings only. Figures from the LiW survey have been scaled up so that the total number of properties matches the total dwelling stock figure for Wales published by DCLG. This adjustment means that the estimates are for all properties in Wales, whether occupied or unoccupied, assuming that there are no differences between occupied and vacant homes.

Categorising properties

Cavity wall insulation figures taken from each of the housing surveys are then categorised into one of the following five categories:

- Insulated
- Insulated or meets equivalent standard
- Uncertainty
- Limited potential
- Not insulated

³<http://www.communities.gov.uk/housing/housingresearch/housingsurveys/englishhousingsurvey/>

⁴<http://www.communities.gov.uk/housing/housingresearch/housingstatistics/housingstatisticsby/stockincludingvacants/livetables/>

⁵<http://www.scotland.gov.uk/Topics/Statistics/SHCS>

These categories are based on building regulations and the classification used in RdSAP. The rationale for the categorisation is the same for each country, although building regulations in Scotland differ from those in England and Wales which means there are some differences between the years allocated to each category. Table 1 below shows how properties are allocated to each of the five categories for the 2008 baseline.

Table 1: Classification of cavity wall properties

Category	Description	Country		
		England	Wales	Scotland
Insulated	Properties with cavity wall insulation.	Assume all pre 1996 properties classified as having cavity wall insulated on the EHS are insulated (+ additional 5% for unobserved insulation as recommended by the organisation that conducted the survey).	Assume all pre 1996 properties classified as having cavity wall insulated on the LiW survey are insulated (+ additional 5% for unobserved insulation as recommended for England).	Assume all pre 1992 properties classified as having cavity wall insulated on the SHCS are insulated (+ additional 5% for unobserved insulation as recommended by BRE for England).
Insulated or meet equivalent standard	Properties with cavity wall insulation or a thermal performance equivalent to having insulation.	All post 1995 properties (RdSAP assumes u-value of 0.45 or better from 1996).		All post 1991 properties (RdSAP assumes u-value of 0.45 or better from 1992).
Uncertainty	Properties which may or may not have cavity wall insulation.	5% of properties recorded as insulated on housing surveys (pre 1996 in England and Wales, pre 1992 in Scotland), due to 5-10 per cent under reporting recommendation by BRE, the other 5 per cent is adjusted for in the 'Insulated' category.		
Limited potential	Properties which were not built to current building regulations, but have a thermal performance close to current standards and therefore savings from additional insulation would be very small.	Properties built between 1983 and 1995 (inclusive) and classified as uninsulated on surveys (RdSAP assumes u-value of 0.6 "as built").		Properties built between 1984 and 1991 (inclusive) and classified as uninsulated on surveys (RdSAP assumes u-value of 0.6 "as built").
Not insulated	Properties with no cavity wall insulation.	Remaining cavity wall properties i.e. all pre 1983 properties recorded as uninsulated on EHS/LiW (less 10% of insulated property value added for uncertainty (5%) and included in insulated properties (5%)).		Remaining cavity wall properties i.e. all pre 1984 properties recorded as uninsulated on SHCS (less 10% of insulated property value added for uncertainty (5%) and included in insulated properties (5%)).

Loft insulation

Estimates of the number of properties with loft insulation use April 2008 survey data as a baseline. Loft insulation figures taken from each of the housing surveys are categorised into one of the following four categories:

- Insulated
- Easy to treat
- Hard to treat
- No loft

Table 2 below shows how properties are allocated to each of the four categories for the 2008 baseline. It should be noted that categorisation of properties reflects the state in the majority of the property (as coverage may not be uniform across the whole loft space – due to hatches, boarding, eaves, extensions etc).

Table 2: Classification of loft insulation

Category	Description
Insulated	Properties recorded in each of the property surveys as having 125mm or more of loft insulation in the housing surveys.
Easy to treat	Properties recorded as having less than 125mm of loft insulation in the housing surveys less the hard to treat estimate.
Hard to treat	Properties that contain lofts which are hard to insulate. For example properties with a flat roof or a roof with a very shallow pitch make the loft space inaccessible.
No loft	Properties recorded on the housing surveys as having no loft.

Solid wall insulation

Estimates of the number of properties with solid wall insulation use both information recorded in each of the April 2008 housing surveys and measures delivered through the Government's Energy Efficiency Commitment (EEC). Solid wall insulation figures are categorised into one of the following three categories:

- Insulated
- Uncertainty
- Not insulated

Table 3 below shows how properties are allocated to each of the three categories for the 2008 baseline.

Table 3: Classification of solid wall properties

Category	Description
Insulated	Properties which have received solid wall insulation through the Government's Energy Efficiency Commitment.
Uncertainty	Properties recorded in each of the 2008 property surveys as having solid wall insulation minus the number of insulations through EEC. The quality of solid wall insulation delivered outside Government schemes is unknown – it is possible that older installations may not have reached modern standards of thermal performance.
Not insulated	Properties recorded in each of the property surveys as having solid walls with no insulation.

Sources of increases in insulation levels

Insulation measures installed since April 2008 (when the Carbon Emissions Reduction Target started) are estimated based on administrative data from Government schemes and data on new build properties published by DCLG. The section below outlines how these data are added to the April 2008 baseline figures to give current estimates, the Government schemes included in this release and how newly built homes are classified.

Cavity wall insulation

Each quarter cavity wall insulation delivered through Government schemes is added to the 'insulated' category, and the equivalent number is taken from the 'not insulated' category. New build figures are added to the 'insulated or meets equivalent standard' category. The ['Government Schemes'](#) section of this note outlines in more detail the Government schemes included in this publication.

Loft insulation

Each quarter loft insulation installations delivered through Government schemes are added to the 'insulated' category, and the equivalent number is taken from the 'easy to treat' category – we assume that no hard to treat lofts are being insulated through Government schemes. New build figures are split between the 'insulated' and 'no loft' categories – all new build houses and flats with a loft are added to the 'insulated' category, whereas flats without a loft are added to the 'no loft' category. Using data from the EHS it is estimated that 60% of flats do not have a loft; it is assumed this is the case for new build flats as no information on the actual figure is available. The ['Government Schemes'](#) section of this note outlines in more detail the Government schemes included in this publication.

Solid wall insulation

Each quarter solid wall insulation delivered through Government schemes is added to the 'insulated' category, and the equivalent number is taken from the 'not insulated' category.

All new build properties are assumed to have cavity walls and do not therefore affect the solid wall insulation figures. The '[Government Schemes](#)' section of this note outlines in more detail the Government schemes included in this publication. In addition to installations through Government schemes, we will be exploring the extent of solid wall insulation installed through other routes for future publications through discussions with trade bodies and local authorities. It should also be noted that some solid wall insulation installed through Government schemes may have been applied to hard to treat cavity wall properties, it is not currently possible to differentiate these so the estimates may slightly over estimate the number of solid wall properties and be inaccurate in the assumption that no hard to treat cavity wall properties have been insulated.

Government Schemes

Measures installed through Government schemes prior to April 2008, such as through the Government's Energy Efficiency Commitment (which ran between 2002 and 2008) and early Warm Front, should be included in the insulation figure reported in each of the housing surveys. Measures installed since April 2008 through the following policy programmes are included in the in these estimates:

- **The Carbon Emissions Reduction Target (CERT).** CERT required all domestic energy suppliers with a customer base in excess of 250,000 customers (increased from 50,000 at the end of December 2011) to make savings in the amount of CO₂ emitted by households in England, Scotland and Wales. Suppliers meet this target by promoting (including through subsidies) uptake of low carbon energy solutions to domestic energy consumers, including insulation measures. CERT began in April 2008 and finished in December 2012. CERT was regulated by Ofgem, who reported supplier progress towards their CERT target in summary form on a quarterly basis and also provided a more extensive annual review of the scheme⁶.
- **Warm Front⁷.** The Warm Front scheme provided heating and insulation improvements to households in England on certain income-related benefits living in properties that were poorly insulated and/or did not have a working central heating system. Qualifying households could get improvements worth up to £3,500 (£6,000 where oil central heating and other alternative technologies were recommended). Some of the activity delivered through Warm Front was sold to CERT obligated companies and therefore included in the CERT delivery figures. This traded activity was assumed to be included in the CERT figures provided by Ofgem and therefore, to avoid double counting, was not included in the Warm Front figures. It was assumed that 50% of cavity wall insulation was traded back to CERT, and 50% of loft insulation installed into lofts which previously had no insulation is traded back to CERT.
- **Community Energy Saving Programme (CESP)⁸.** CESP targeted households across Great Britain, in areas of low income, to improve energy efficiency standards, and reduce fuel bills. There were 4,500 areas eligible for CESP. Like CERT, CESP

⁶<http://www.ofgem.gov.uk/Sustainability/Environment/EnergyEff/CU/Pages/CU.aspx>

⁷http://www.decc.gov.uk/en/content/cms/funding/warm_front/warm_front.aspx

⁸http://www.decc.gov.uk/en/content/cms/funding/funding_ops/cesp/cesp.aspx

was funded by an obligation on energy suppliers and electricity generators. CESP delivery was reported by Ofgem twice a year (reporting activity up to the end of June in September and activity to the end of December in March). New delivery was included when updates were available. The impact of CESP estimates is most significant for solid wall insulation, it contributes less than 1 per cent of cavity wall and loft insulation.

- Green Deal⁹. The Green Deal was launched on 28 January 2013 in England and Wales (and on 25 February in Scotland) and will tackle a number of the key barriers to the take-up of energy efficiency measures. Customers have a Green Deal Assessment undertaken and then have a choice on how to proceed. They might take the view that their home is sufficiently energy efficient, or that they want to finance work through a Green Deal plan or use alternative funding arrangements (e.g. use of savings).
- Energy Company Obligation (ECO)¹⁰. The Energy Company Obligation started on 1 January 2013 (although energy companies have been able to deliver against their targets since 1 October 2012) and runs to 31 March 2015. It replaces CERT and CESP, and focuses on providing energy efficiency measures to low income and vulnerable consumers, and those living in hard to treat properties.

New builds

Information on the number of new properties built in Great Britain is taken from DCLG¹¹. It is assumed that all new dwellings are built with:

- cavities and that these are filled when built. However, some modern constructions will have other types of structure, for example glass, but would not benefit from further insulation as they will meet required thermal performance standards. These new build properties are added to the 'insulated or equivalent' category for cavity wall insulation.
- lofts that have at least 270mm of loft insulation fitted as standard. It is assumed all houses have a loft and that 40% of flats have a loft. The number of new build flats is based on the proportion of new builds in England which are flats, as published by DCLG¹². It is then assumed 40% of these have a loft, based on the proportion of flats in the EHS which are recorded as having a loft. New build homes and top floor flats are added to the 'insulated' category for loft insulation, whereas newly built flats that are not on the top floor are added to the 'no loft' category.

⁹ <https://www.gov.uk/green-deal-energy-saving-measures>

¹⁰ <https://www.gov.uk/government/policies/helping-households-to-cut-their-energy-bills/supporting-pages/energy-companies-obligation-eco>

¹¹ Tables 213 – 215: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building>

¹² Table 254: <https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building>

DCLG also separately publish estimates of the number of net additional dwellings¹³. These are included in the ‘uncertainty’ category, as it is unknown what insulation features demolitions and conversions had or are built with¹⁴.

Assumptions made in producing the estimates

Due to data availability, a number of further assumptions are made in order to produce the insulation estimates. These are outlined below.

Cavity wall insulation

- Cavity wall insulation is becoming increasingly difficult to identify, as over time the injection holes age, fade or are covered up by later work, and contractors are getting better at disguising their work. This may mean that the housing surveys under estimate the number of homes with cavity wall insulation. The Building Research Establishment (BRE) estimate that the EHS 2008 and previous English House Condition Surveys under-estimate the number of filled cavities by between five and ten per cent. The survey estimates which make up the ‘insulated’ category for cavity wall insulation in April 2008 have therefore been adjusted up by five per cent to take account of this. The ‘uncertainty’ category for cavity wall insulation in April 2008 is made up of 5% of the ‘insulated’ category, and should be considered this way when considering the remaining potential.

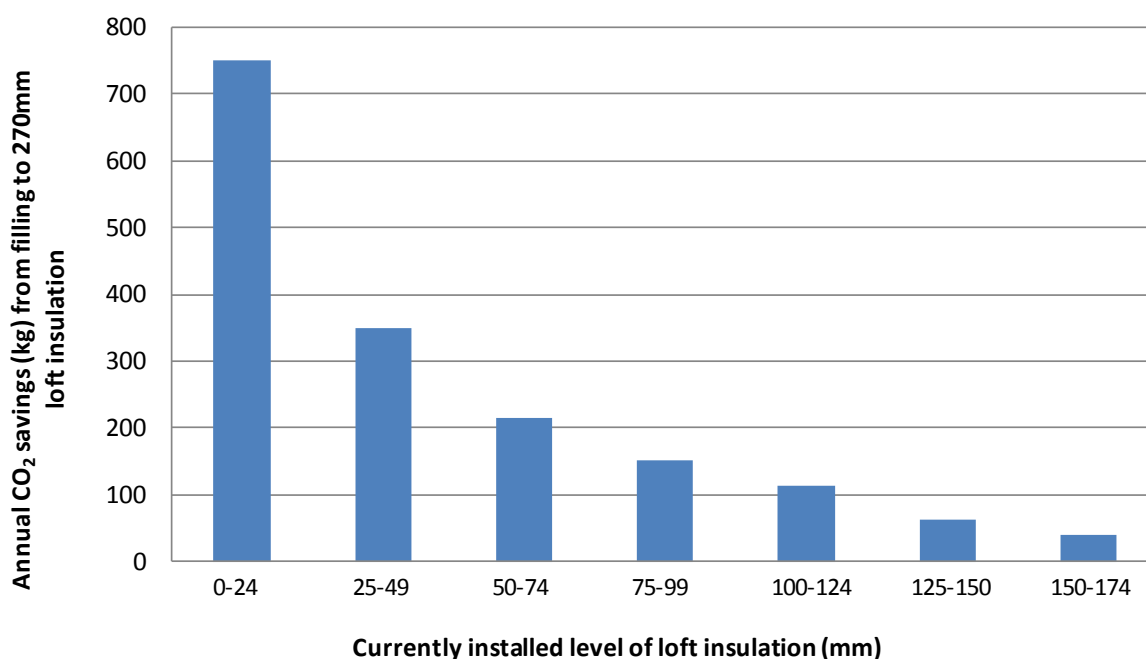
Loft insulation

- The Committee on Climate Change propose an under insulated loft as one with less than 125mm of existing insulation. There is a strong ‘diminishing returns’ effect with savings from loft insulation; the first inch gives about half the savings of full insulation – see figure 2 below. Therefore the more insulation a property has the less cost effective it is to add further insulation. For the 2008 housing surveys a threshold of 125mm is used to describe a property as having loft insulation.

¹³ Net additional dwellings include new build permanent dwellings; plus net gain from dwelling conversions; plus the net gain of non dwellings brought into residential use; plus net additions from other gains and losses to the stock (such as mobile and temporary dwellings); less any demolitions.

¹⁴ The net change in dwellings is made up of approximately 20,000 annual additions and 15,000 demolitions. New build estimates are equivalent to approximately 95 per cent of the change in dwellings.

Figure 2: Annual CO₂ savings from loft insulation for a typical UK house



- Data provided from Government schemes does not identify how much insulation was present before the loft insulation was installed. An assumption has been made that 10 per cent of professional loft insulations through Government schemes are top-ups of existing insulation above 125mm. These have not been included to avoid double counting. Under CERT a loft with over 160mm of existing loft insulation would not have been eligible for the scheme.
- The level of DIY insulation through CERT is reported by Ofgem based on sales by square metre rather than dwellings. Using English Housing Survey (EHS) data it is possible to estimate the average size of a loft by dividing useable floor space by the number of floors. Using this approach estimates the average loft size to be about 50m². The number of square meters sold is then divided by 50 to get an estimate of the number of lofts insulated.
- Ofgem have produced detailed guidelines for organisations involved in the sale and installation of CERT funded insulation material which should prevent professional insulation companies purchasing insulation that is meant for DIY consumers. However it is recognised that some CERT subsidised loft insulation could still be used by DIY consumers for non CERT eligible projects, including extensions and wastage. It is therefore assumed for DECC estimates that the level of this is 10 per cent. So, for example 55 million square meters of loft insulation sold insulates 1 million CERT eligible lofts.

Solid Wall Insulation

- Solid wall insulation has been defined throughout the Statistical Release as internal or external wall insulation installed through Government programmes: The Green

Deal, The Energy Company Obligation, The Carbon Emissions Reduction Target (CERT); The Community Energy Saving Programme (CESP); or The Energy Efficiency Commitments (EEC1, EEC2). These recent installations of solid wall insulation (SWI) use materials such as expanded polystyrene, mineral wool, or phenolic board. Some older installations may not have reached modern standards of thermal performance¹⁵ and are therefore not reported in the headline figure but reported as uncertainty; housing surveys estimate that in April 2008, about 191,000 homes had other forms of non-cavity wall insulation.

- Solid wall insulation can be applied externally or internally¹⁶. For a variety of reasons, households may have insulation applied to specific rooms (internal SWI) or certain walls only (internal or external SWI). The headline figures reported in this statistical release include all homes with at least one wall or room with SWI. Insulation activity reported in CERT may include some partial installation of SWI.
- Some cavity wall homes may have solid wall insulation. There are technical reasons why some unfilled cavity walls are hard to treat, which means that SWI may be preferable. If these have been done as part of a Government scheme then they will be included in the solid wall insulation estimates, this means we could be overestimating the number of solid wall properties with insulation, and underestimating the number of cavity wall properties with insulation. This should be considered when comparing with the number of remaining homes that could benefit from solid wall insulation.

Uses of data

Data in this release can be used to find out how many homes in Great Britain currently have cavity wall insulation, loft insulation and solid wall insulation. It can also be used to estimate the number of homes that have the potential to receive insulation in the future – this is important when new policies are being developed as it is possible to estimate the number of homes that could receive insulation under a specific policy. This publication has already been used in the development of the Green Deal to help inform estimates on how many homes could benefit from this policy.

Revisions policy

On occasions, previously published data will need to be revised due to changes to source data, methodology or correcting of errors. These will be made at the time of the next release unless the changes are significant, in which circumstances the revised estimates will be published at the earliest opportunity. Data that are revised from the previous release will be denoted with “r”. Where a large revision has taken place reasons will be provided. The main sources of revisions are outlined below:

¹⁵ Following SWI walls should have a thermal transmittance (u-value) of 0.35 W/m².K or less.

¹⁶ Internal SWI has the advantage of not changing the external appearance of period properties, while external SWI leaves the floor area unchanged. External SWI finishes, either rendered or cladding, can be used to improve the exterior appearance of properties undergoing refurbishment.

- The most recent quarter's data will be produced as provisional estimates. Data that are not available in time for the estimates will be incorporated into the statistical release following it becoming available.
- DECC will review these insulation estimates annually following publication of housing survey data. Given the nature of survey data there is some uncertainty around the estimates from these surveys which makes it difficult to accurately quantify year on year changes. Changes will only be made to the insulation baseline and time series if there is compelling evidence that the estimates are incorrect.
- DECC will update estimates of the hard to treat and easy to treat splits, and estimates on uncertainty if more evidence becomes available which increases current knowledge.

Plans for future development

There are a number of further developments planned for this publication which are outlined below:

- Explore the extent of solid wall insulation installed through other routes through discussions with trade bodies and local authorities.

And in the longer term it is also intended that this publication will:

- Provide a breakdown for England, Wales and Scotland, in addition to the GB headline figure.
- Provide a breakdown of uninsulated solid wall properties by properties you would and wouldn't chose to insulate.

Table 4 shows the timetable for future publications including some elements which will only be published annually.

Table 4: Timetable for publications

Month of publication	Estimates
December 2013	October 2013 estimates of home insulation levels, include finalised dwelling stock data.
March 2013	January 2014 estimates of home insulation levels.
June 2013	April 2014 estimates of home insulation levels and updated estimate of number of properties with no loft insulation and UK estimate.

Further information and feedback

Any enquiries or comments in relation to the methodology set out in this document should be sent to DECC's Energy Statistics Team at the following email address:

EnergyEfficiency.Stats@decc.gsi.gov.uk

Contact telephone: 0300 068 6289

Further information on the range of DECC's energy statistics is available at:

<http://www.decc.gov.uk/en/content/cms/statistics/statistics.aspx>

Issued by:

Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.decc.gov.uk

