Department for Energy Security & Net Zero

Accredited

Household Energy Efficiency Statistics: Methodology note

February 2026 **Accredited Official Statistics**

Contents

Summary of data sources

The estimates use administrative data generated as part of the Green Deal (GD) and Energy Company Obligation (ECO) processes. For the annual detailed statistical release, scheme administrative data from the Green Homes Grant Vouchers (GHGV), the Social Housing Decarbonisation Fund (SHDF), the Great British Insulation Scheme (GBIS) and the Green Homes Grant Local Authority Delivery (LAD) scheme are included in some tables to provide a broader overall view of household energy efficiency schemes. In addition, the estimates of home insulation levels use data contained within the national housing surveys and published by the Ministry of Housing, Communities and Local Government (MHCLG), Welsh Government and National Records of Scotland to build up an overall picture of the housing stock in Great Britain.

There are several sources of administrative data used to produce these statistics – each report will state which sources have been used, based on the content being included:

- Ofgem – who administer the Energy Company Obligation (ECO) and the Great British Insulation Scheme (GBIS) and collect information from energy companies on measures installed under ECO and GBIS, and associated costs.

- Green Deal Central Charge Database – which manage the recording and administration of Green Deal Plans.

- NEC Software Solutions UK – who manage the national lodgement of Green Deal measures in England and Wales. NEC Software Solutions UK (formerly Northgate) took over the scheme management from Landmark in September 2017.

- Energy Savings Trust Scotland (EST) – who manage the national lodgement of Green Deal measures in Scotland.

- GHGV scheme delivery partner – who administered the Green Homes Grant Voucher (GHGV) scheme. The delivery partner collected data from applicants and installers on vouchers applied for, measures installed and associated costs.

- Local LAD Local authorities (LAs) and Local Energy Hubs – who administer funding for household energy efficiency measures under LAD and HUG and who were successful with bids for funding under the LAD and HUG competitions. The scheme is administered in phases, with LAD Phase 1 administered directly through LAs, LAD phase 2 is through the local energy hubs, and LAD Phase 3 and HUG directly through LAs. Data is collected on the households' receiving measures and the measures installed.

- Local authorities and registered providers of social housing for the Social Housing Decarbonisation Fund (SHDF) – who administer scheme funding so collect data from householders and installers on delivery.
- National housing surveys – which collect data on the housing stock in England, Wales, and Scotland.
- MHCLG – which produce information on the number of properties in the housing stock and new builds.
- Inbuilt – a report produced by Inbuilt is used to inform estimates on the number of hard-to-treat cavity wall properties in the housing stock.
- Office for National Statistics (ONS) – which produce map boundary files and geography lookup tables.
- ONS, Welsh Government and National Records of Scotland - households with at least one usual resident.

After appropriate quality assurance, the data from these data sources are used to produce the headline and detailed estimates included in Accredited Official Statistics releases.

We will continue to update the detail on each part of the methodology as we publish more information in the headline and detailed Accredited Official Statistics releases.

In addition, the statistics on insulation levels which make use of Accredited Official Statistics from national housing surveys/other data sources rely on the data quality assurance processes as published by the producing departments.

Data quality of data sources

The administrative data sources listed above are all subject to a range of data quality checks employed by both data providers and the Department for Energy Security and Net Zero (DESNZ) to ensure that data are as fit for purpose as possible. These checks are summarised below:

NEC Software Solutions UK / Energy Savings Trust Scotland (EST)

NEC Software Solutions UK manage the Green Deal measures data for England and Wales. The Energy Savings Trust Scotland (EST Scotland) manage the equivalent data for Scotland GD plans.

In addition to the data provided by NEC Software Solutions UK and EST, some data on Energy Performance Certificates associated with Green Deal plans are used to identify the date the plan went live and the details of the finance plan from publicly available sources for the EPC registers.

Green Deal Central Charge Database

The Green Deal Central Charge (GDCC) database is used by electricity suppliers and Green Deal Providers and is governed by, and made available under, the Retail Energy Code (REC). The Retail Energy Code Company (RECCo) is responsible for operating the service and has the role of implementing any necessary changes to the REC to support the implementation of the Green Deal. The GDCC stores Green Deal Plan charge data that facilitates the collection and remittance of Green Deal payments in Green Deal Plans. The database contains all financial information and controls the information/data flows which are required as part of the Green Deal. There are many data checks to ensure that GD Plan data is accurately registered and can be accessed by the relevant participants. This database is mainly used to determine the Green Deal Plan Record Statuses. The GDCC provides a status flag in relation to the Green Deal Plan record and has logical rules regarding status transition. So, for example, for a Green Deal Plan to be “LIVE” there was a check to ensure the Green Deal Charge information was sent to the Green Deal Licensee and the Green Deal Licensee confirmed that the Supplier Verification was successful in relation to that request.

The functions of the GDCC Database permit:

- Registering of a Green Deal Plan.
- Recording of relevant data for each Green Deal Plan.
- Update to relevant data by organisations, including the validation of such data.
- Information exchange between relevant GDCC users, which information shall include confirmations and rejections as well as data exchange.
- Access to data records, flows, logs, and any other relevant information as may reasonably be expected or required under any audit pursuant to the REC.

Ofgem

Ofgem undertake comprehensive validation checks on the ECO measures (including ECO1, ECO2, ECO Help-To-Heat, ECO3, ECO3 Interim and ECO4 periods) reported by energy suppliers in the month following receipt of data. These include data correction or completion of missing information.

Ofgem also undertakes technical monitoring, longer-term audits that are completed over the obligation period to verify the installation of the measures, the quality of installations and to ensure compliance with the ECO guidelines. These involve further scrutiny of measures installed which may also involve site visits to properties.

Users/uses of the report

A user consultation was launched on 20 August 2015 to seek views on several proposals to the previous statistical series on the Green Deal and Energy Company

Obligation. The consultation and response (published on 19 November 2015) can be found here: DECC household energy efficiency national statistics user consultation (opens in new window)

The user consultation also sought views from key users on which statistics they were using and what they used them for. The responses received showed that these statistics had a wide audience covering the following sectors: energy suppliers, energy industry organisations, consumer protection organisations, Central Government/Agency, and Local Authorities.

The department also consulted with internal colleagues, which highlighted that the statistics published in the headline release are used by analytical and policy colleagues to monitor the GD/ECO policy through regular, quality assured figures.

The consultation responses showed there was a need to provide regular detail on ECO. Respondents viewed the ECO tables as a key source of data for the ECO supply chain, including assessors, installer organisations, and obligated companies (i.e., energy suppliers). They used the tables to monitor overall progress towards the obligation. It was felt that stopping the release of ECO information on a monthly basis would have a detrimental effect on the ECO supply chain due to the data lag. Respondents also felt the ECO tables were needed monthly as it approached the end of the delivery phase so that progress could be closely monitored. Respondents were less concerned about statistics relating to the GD moving to a quarterly reporting frequency – it was felt that this information was now less relevant due to the announcement made by DECC in July 2015, and that overall it was less critical to their own needs.

From December 2015 (following the consultation response) this statistical series has made the following changes:

- In response to concerns expressed by some respondents, the frequency of any ECO only related statistics has not been reduced.
- Headline figures on Green Deal related statistics previously published monthly, are now released on a quarterly basis, except for Cashback, Green Deal Home Improvement Fund and Green Deal Communities (as all these schemes have now closed).
- Detailed figures on Green Deal related statistics, insulation levels and interactions between other schemes (e.g., Feed-in Tariffs) previously published quarterly, will now be released on an annual basis.
- Improved design and accessibility of the tables (including detailed time series breakdowns) and accompanying commentary.

The routine publication of these statistics following Accredited Official Statistics guidelines has allowed reporting to be based on the latest, independently published figures. The releases continue to reflect policy and external interest by, for instance, including geographic breakdowns. As well as providing a regular evidence base for

users, this enables Parliamentary Questions and other enquiries to be answered in a robust and transparent manner.

There has been a sustained demand for figures on ECO. These are used by colleagues in DESNZ and across Government to evaluate the number and type of measures being installed and, in conjunction with Ofgem's ECO1 compliance report, CSCO compliance report, ECO2 Final Determination Report and ECO3 Final Determination Report, energy suppliers' delivery against their obligations. Information on the costs of delivering ECO, published quarterly in the headline release, is used across Government to estimate the overall cost of the scheme. This facilitates public accountability and allows energy suppliers to benchmark their own costs against the average for each obligation.

There is also strong local and regional interest in the figures. Headline releases present ECO measures and individual households by Local Authority and Parliamentary Constituency. These breakdowns help demonstrate to the supply chain where demand for energy efficiency measures is focussed. ECO is also a Great Britain-wide policy, and the regular publications of these figures are used by the Devolved Administrations and Local Authorities to demonstrate how many measures have been installed in specific areas.

The insulation levels section of the detailed release is used by DESNZ and industry to view estimates on how many homes in Great Britain currently have cavity wall insulation, loft insulation and solid wall insulation. The statistics also allow monitoring of how many homes have been insulated through the rollout of various Government schemes since March 2013. It can also be used to estimate the number of homes that have the potential to receive insulation in the future (including a split by easy and hard to treat properties) – 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. Similarly, this information can be used by the supply chain to gauge the likely demand for specific energy efficiency measures.

ECO measures (headline and detailed releases)

ECO-obligated energy suppliers notify Ofgem of installed measures, with a one-month lag between the installation period and notification date (e.g., measures installed up to the end of August were notified to Ofgem by the end of September to be published in October). Under ECO3, the data at this initial stage were **unprocessed** by Ofgem and were shared with DESNZ early the following month. The December 2015 headline statistics release uses the final ECO 1 processed data, following Ofgem's final compliance report of ECO1 measures (January 2013 – March 2015).

Ofgem would undertake comprehensive validation checks on the measures reported by energy suppliers in the month following receipt of data and longer-term audits completed over the obligation period. DESNZ would receive **processed** data from Ofgem early the following month, which stated which measures had been approved and which required further clarification by energy suppliers.

Under ECO4, DESNZ receives data on notified projects (including the household details) and on notified measures. Measures are marked as pending until the Project Reference Number has been provided and the measure has passed several checks and has been approved by Ofgem. The statistical release only includes measures with a Project Reference Number attached to obtain geographical information on where these measures have been installed.

All figures are **provisional** until after the end of the ECO period and following Ofgem's final compliance report for that period. Ofgem have six months after the end of each ECO period to produce their final compliance report, when all measure statuses should be finalised. For CSCO, as the ECO Help-to-Heat Order closed this obligation, Ofgem published their final compliance report for CSCO on 28 September 2017. However, suppliers could re-elect surplus measures out of CSCO after this date, up until 31 December 2018.

For ECO2, Ofgem published their ECO2 Final Determination Report on 11 April 2019, though suppliers could re-elect surplus measures out of ECO2 into ECO3 after this date. In the February 2022 quarterly release, BEIS (now DESNZ) revised the statistics to reflect the re-election of the ECO2 surplus actions to ECO3. There were around 82,000 ECO2 surplus actions approved by Ofgem.

For ECO3, Ofgem published their ECO3 Final Determination Report on 9 February 2023, though suppliers could re-elect surplus measures out of ECO3 into ECO4 after this date. In the August 2024 quarterly release, DESNZ revised the statistics to reflect the re-election of the ECO3 surplus actions to ECO4. There were around 60,700 ECO3 surplus actions approved by Ofgem.

The ECO measures figures in the statistical releases are based on the **latest available information.** Any measures which have been rejected by Ofgem or withdrawn by obligated energy suppliers have been excluded from the ECO measures reported.

ECO Help-To-Heat measures have been reported from the June 2017 Household Energy Efficiency Headline Release. On 30 January 2017 BEIS (now DESNZ) at the time published the response to the ECO: Help to Heat consultation (which ran from 29th June 2016 to 17th August 2016). This covered the future ECO scheme, ECO2t, which followed the end of ECO 2 (on 31 March 2017).

ECO3 measures have been reported from the February 2019 Household Energy Efficiency Headline Release. On 19 July 2018 BEIS (now DESNZ) published the response to the Energy Company Obligation, ECO3 2018 - 2022 consultation (which ran from 30 March 2018 to 29 April 2018). This covered the future of the ECO scheme, ECO3, which went live on 3 December 2018 and ran until March 2022. Measures installed from October 2018 were included in ECO3 and any excess measures from ECO Help-to-Heat could also be re-elected into ECO3. These re-elected measures were included under ECO3 from the February 2022 publication.

ECO4 measures have been reported from the November 2022 Household Energy Efficiency Headline Release (indicative estimates based on data from Trustmark were reported in September and October 2022). On 20 July 2021 BEIS (now DESNZ) published a consultation on the Design of the Energy Company Obligation

ECO4: 2022-2026. This covered the future of the ECO scheme, ECO4, and ran until 3 September 2021. The government response to the Energy Company Obligation (ECO4) consultation, published April 2022, sets out the policy of the scheme from April 2022 until March 2026. Measures installed from April 2022 were included in ECO4 and any excess measures from ECO3 could also be re-elected into ECO4. These re-elected measures were included under ECO4 from the August 2024 publication.

In August 2025, DESNZ consulted on proposals to extend the ECO4 end date, as set out in Extending the ECO4 end date: consultation document. One of the policy decisions from that consultation was that ECO4 will be extended by nine months, ending on 31 December 2026, to allow suppliers additional time to meet existing targets and remediate non-compliant installations.

ECO households (headline and detailed release)

The provisional number of households in receipt of ECO measures is calculated using the address information reported in the ECO measures data by energy companies. DESNZ use a de-duplication process (which strips out any non-alpha-numeric characters and upper-case letters) to estimate the number of unique properties in receipt of one or more ECO measures.

DESNZ also presents information on *ECO4 repeat households* in the quarterly report (see definition below). The below text explains how these figures are calculated.

Definitions:

First-Time Households: 'First-time' households are households that have never installed a measure before under the respective ECO phase.

ECO4 Repeat Households: ECO4 repeat households are households that have returned to install a measure under ECO4 (including ECO3 Interim) after having installed a measure (or measures) in earlier phases of the scheme.

To calculate ECO4 repeat households, the number of 'first-time' households per month are calculated for ECO across all phases (ECOALL) and calculated separately for ECO4 to identify unique households in this phase. The ECOALL figure is then subtracted from the ECO4 figure on a monthly basis to provide an estimate of repeat households for that month. Note that the monthly figures for first-time households across all ECO phases are presented in Table 1.2.

Consider an example using *Household A*. If ECO measure installations across the whole scheme (from January 2013) are considered, and *Household A* installed one measure in April 2013 (ECO1-2 phase) and one measure in April 2019 (during the ECO3 phase), it would only be considered a 'first-time' household in April 2013 as that is the first time it appeared in all ECO phases (ECOALL). However, if the ECO4 phase is taken in isolation, then *Household A* would be a 'first-time' household under ECO4 in April 2022 as that is the first time it installed an ECO4 measure. The difference between the April 2022 monthly figures for ECO4 and the April 2022 monthly figures across all ECO phases) are then the repeat households as if all ECO

phases were considered, *Household A* would not appear as a 'first-time' household in the monthly figures in April 2022 but appears if only the ECO4 phase is considered.

The formula is then as follows:

ECO4 Repeat Households = 'First-time' ECO4 households' monthly figure – 'First-Time' ECOALL households' monthly figure

ECO property characteristics (headline and detailed releases)

Tables breaking down property type and tenure by obligation are based on the obligation of the first measure installed. There can only be one property type or tenure per household, so this ensures no double-counting occurs. Other ECO tables presenting the total number of ECO measures reflect all measures installed. For the provisional number of households receiving ECO measures by tenure and ECO obligation, where 'socially-rented' has been recorded under Affordable Warmth measures installed, these are treated as "unknown" (as it is not possible for socially rented properties to benefit from measures delivered under Affordable Warmth).

ECO Geographic breakdowns (headline and detailed releases)

Provisional numbers of ECO measures installed by region, administrative area, and Parliamentary Constituency are available in the headline Accredited Official Statistics release.

Provisional numbers of households in receipt of ECO measures by region, administrative area, and Parliamentary Constituency are available in the headline Accredited Official Statistics release.

ECO measure types (headline and detailed releases)

Tables breaking down ECO measures by type, include the following acronyms:

- Standard CWI – Standard Cavity Wall Insulation
- HTTC – Hard to Treat Cavity
- Micro CHP - Micro Combined Heat and Power
- DHS – District Heating System
- District Heating: CHP upgrades – District Heating Combined Heat and Power upgrades
- Solar PV - Solar Photovoltaic

For external and internal wall insulation, where recorded under certain ECO phases, the reason for splitting by 'built from 1967' and 'built pre-1967' is due to building regulation changes in England and Wales (note that for Scotland this is pre and post 1965). From the 1960s, constructional changes have been caused primarily by

amendments to regulations for the conservation of fuel and power, which have called for increasing levels of thermal insulation.

Heating controls measures include the installation or upgrade of devices that enable households to better regulate space and water heating, such as programmers, room thermostats, thermostatic radiator valves, and smart or advanced control systems. For statistical reporting purposes, where multiple heating control components are installed at the same property as part of a single intervention or package and are recorded as the same control type, these are treated as one heating controls measure. Where different types of heating controls are installed at the same property (for example, a programmer alongside thermostatic radiator valves), each distinct control type is counted as a separate measure. This approach ensures consistency in measure counting while reflecting the range of control technologies installed.

ECO delivery costs (headline and detailed releases)

DESNZ receives quarterly summary information from all obligated energy companies on their costs associated with delivering ECO.

Delivery costs are defined as the cost of installing an ECO measure in a property. This includes the costs of technical monitoring, cost of assessment, costs involved with searching for ECO properties, installation costs and marketing costs by delivery partners involved with promoting the ECO obligations. These costs should include Value Added Tax (VAT) when it is not applicable for suppliers to claim this back from HMRC. These costs should not include those ordinarily associated with Green Deal (e.g., insurance-backed guarantees). Some costs may be estimated prior to the measure being fully installed or incurred prior to when the carbon or cost savings are reported.

The aggregate delivery costs are historic costs and future costs may go up or down depending on a range of factors. Cost savings are based on all measures.

The headline release presents the average price by obligation and the highest and lowest prices reported (upper and lower quartiles from ECO3 on) by suppliers for each obligation, where appropriate to show these. The suppliers have not been identified to protect commercial confidentiality. This shows that some energy suppliers are discharging their obligation more cost effectively than others.

ECO Brokerage (*discontinued series*)

The ECO Brokerage system operated as an anonymous auction, where providers could sell ‘lots’ of future measures of ECO Carbon Saving Obligation (*now closed*), ECO Carbon Saving Communities (*now closed*) and ECO Affordable Warmth, to energy companies in return for an ECO subsidy. The outcomes of each auction are publicly available, and the data are used without any adjustment. Until January 2021, these auctions occurred on a fortnightly basis. From February 2021, the auctions were held monthly. In May 2021, Crown Commercial Services (CCS) announced the

decommissioning of the ECO brokerage mechanism in June 2021, with the final auction (Auction 205) occurring on 25th May 2021.

Green Deal Assessments (*discontinued series*)

The GD Assessment process

A Green Deal Advisor would come to the property and use the Standard Assessment Procedure (SAP) to assess the energy and environmental performance of the property and produce an Energy Performance Certificate (EPC). This only needed to be done where a valid EPC had not already been completed. The Green Deal Advisor would then carry out an Occupancy Assessment (OA) relating to the energy usage of the household.

The Advisor would then 'lodge' the EPC and OA on the central register as a Green Deal Advice Report (GDAR). As stated in the Specification for GD Organisations,[1] Advisors must have lodged the EPC and OA within two weeks of the assessment taking place.

Once any measures have been installed in the property through a GD Finance Plan, then a final EPC would be lodged, showing the updated energy efficiency of the property with the new measures included.

An Advisor could lodge an EPC or OA more than once – reflecting possible mistakes being corrected or a change in recommended measures.

Green Deal Advice Reports (GDARs) were no longer considered by DESNZ to be an effective lead indicator of Green Deal Plans and their associated measures. Some stakeholders had significantly reduced the typical lead time between a GDAR being lodged and a Green Deal Plan going live, meaning that there was often little lag between these. GDARs were also used to facilitate access to some local energy efficiency schemes that began to reflect the majority of activity. It was therefore not possible to determine the share of GDARs that resulted in a Green Deal Plan and hence analyse the take up rate of households receiving Green Deal Finance relative to those who started the process. The publication of GDAR statistics ended in June 2018.

Reporting GD Assessments (headline and detailed releases)

NEC Software Solutions UK and EST Scotland provided DESNZ with a monthly extract from their EPC/GDAR registers, which included the underlying data from each EPC/OA for DESNZ to fully quality assure the data.

[1] Point 6.14.1
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/68627/003-2012_Specification_for_Organisations_providing_the_Green_Deal_Advice_Service.pdf

Each property was counted only once to report the number of GD Assessments, and this was based on the first date when a GDAR was lodged. Any further analysis was based on the latest GDAR that was lodged for the given period in question. Therefore, the analysis for the **headline** release was based on EPC and OA data extracts for the latest period. An additional check was performed to ensure that each GDAR was only recorded once in either of the two national registers (one in England and Wales, and one in Scotland). If a GDAR was lodged in more than one register, then this was only counted once against the correct register based on the location of the property.

The analysis for the **detailed release** was based on EPC and OA data extracts up to the end of the month following the end of each quarter (i.e., for the first quarter of 2016, January to March, extracts were taken up to the end of April). GDARs lodged in more than one register were removed (removing a very small level of double counting).

For the coverage of the statistics to be up to the end of each quarter and to ensure there is no double counting, the following steps are taken:

1. Any GDARs lodged after the end of the quarter (i.e., for the first quarter of 2013, 31 March 2013) were removed using the OA lodgement date to identify these.

2. Duplicates from the resulting file were identified using Unique Property Reference Number (UPRN) and removed so that only the latest GDAR lodged was included (i.e., by sorting in descending order using the “lodgement_date_time” variable).

3. EPCs which relate to these GDARs were included in analysis. Any subsequent EPCs lodged, which do not have a GDAR lodged by the end of the quarter (i.e., for the first quarter of 2013, 31 March 2013), were not incorporated in this analysis.

The further breakdowns presented in the detailed report were all based on the data provided in the data extract files and are outlined below.

Property characteristics (detailed release)

Information relating to the characteristics of properties getting GD Assessments was taken from the Energy Performance Certificate relating to the GD Assessment.

Energy Efficiency Rating (detailed release)

The Energy Efficiency Rating (EER) was presented in an A-G banding system for an Energy Performance Certificate, where Band A rating represents low energy costs

(i.e., the most efficient band) and Band G rating represents high energy costs (the least efficient band). The EER bands based on SAP[2] were:

- Band A (92 plus)
- Band B (81-91)
- Band C (69-80)
- Band D (55-68)
- Band E (39-54)
- Band F (21-38)
- Band G (1-20)

Property type (detailed release)

Properties can be built in a large variety of configurations. A basic division is between free-standing or single-family houses and various types of attached or multi-user dwellings. Both sorts may vary greatly in scale and amount of accommodation provided. Many variations are purely matters of style rather than spatial arrangement or scale.

A house or bungalow has a complete heat loss ground floor and a completely exposed roof. A dwelling without a heat loss floor cannot be a house and must be treated in the GD Assessment as a flat or maisonette. A flat or maisonette does not have both a heat loss ground floor and a heat loss roof.

Reduced Standard Assessment Procedure (RdSAP) makes no distinction between a flat and a maisonette as regards calculations; it is acceptable to select either type as definitions vary across the UK.

Built form (detailed release)

All property types have a built form (not just houses). The four main types of build are detached, semi-detached, end-terrace and mid-terrace.

Mid-terrace has external walls on two opposite sides (this category also includes any 'Enclosed[3] Mid-Terrace' properties which have an external wall on one side only). End-terrace has three external walls (this category also includes any 'Enclosed End-Terrace' properties which have two adjacent external walls).

Recommended measures (detailed release)

The detailed statistical release reported the number of improvements by measures recommended in GDARs. These are the final recommendations an assessor will make to the household following an EPC and an Occupancy Assessment. Recommended improvements were listed in the Occupancy Assessment Technical Appendix, where further details about each of these measures could be found.

[2] Information on the Standard Assessment Procedure is here: https://www.gov.uk/standard-assessment-procedure

[3] 'Enclosed' is typically applicable for 'back-to-back' terraces.

See BRE GD OA Software (opens in new window) for more details.

Green Deal Communities (*discontinued series*)

Twenty-three Lead Local Authorities (covering a larger number of individual Local Authority areas, see table below) in England were allocated £85 million to help deliver energy efficiency improvements through a programme called Green Deal Communities.

Local Authorities had flexibility in how they developed and delivered their own project locally and were encouraged to develop innovative solutions to drive demand (e.g., incentives, marketing, supply chain procurement, etc.). The focus of the programme was on delivering hard to treat energy efficiency measures and/or delivering in hard-to-reach properties, predominantly but not limited to solid wall insulation. The scheme was to engage with and deliver to private households and private landlords, maximising local knowledge to identify appropriate property and support development of the supply chain locally where possible.

Each Local Authority (LA) project lead was required to submit their data at designated interim points and again upon completion of the project, to enable effective evaluation of the programme approach and to inform future policy. This included a largely qualitative self-evaluation report to help understand each project area's model of delivery, enabling understanding as to which approaches to delivery were found to be the most successful. In addition to this, Local Authorities were required to populate a quantitative data template, including data on Green Deal Assessments[4] carried out and completed installations funded through the Green Deal Communities scheme. Interim data returns were submitted covering the period up until the end of January 2015 when most projects were still at an early stage of delivery. Areas subsequently submitted a second interim data return in 2016, covering the period up until the end of March 2016. Following that, areas submitted final data returns, covering the period up until the end of September 2016. Thorough quality assurance of the data was conducted by DESNZ, with figures verified by each lead LA.

The final evaluation of the Green Deal Communities Programme (including final data returns) was published in March 2017. Interim estimates of the number of measures installed up to the end of March 2016 under Green Deal Communities were released in September 2016, with final estimates of measures installed up to the end of the scheme (end of September 2016) released in March 2017, following extensive data quality checks.

[4] The total provisional number of Green Deal Assessments funded through the Green Deal Communities in all project areas is not currently available.

The following table is the full list of Local Authorities which form part of these projects:

Area Name	Participating Local Authorities
Ashfield	Ashfield District Council
Bath & North East Somerset	Bath & North East Somerset Council
Bracknell	Bracknell Forest Council
Bristol Consortium	Bristol City Council, North Somerset Council, South Gloucestershire Council
Broadland Consortium	Broadland District Council, South Norfolk Council, Norwich City Council
Cambridgeshire	Cambridge City Council, East Cambridgeshire District Council, Fenland District Council, Huntingdonshire District Council, South Cambridgeshire District Council, Cambridgeshire County Council
Dartford Consortium	Dartford Borough Council, Kent County Council, Sevenoaks District Council, Dover District Council
East Hampshire Consortium	East Hampshire District Council, Havant Borough Council
Eastleigh Consortium	Eastleigh Borough Council, Portsmouth City Council, Gosport Borough Council, Southampton City Council
Leeds Consortium	Leeds City Council, City of Bradford Metropolitan District Council, City of Wakefield Metropolitan District Council, City of York Council, Barnsley Metropolitan Borough Council, The Borough Council of Calderdale, Harrogate Borough Council, Kirklees Council, Selby District Council, Craven District Council, West Yorkshire Combined Authority
Haringey Consortium	London Borough of Haringey, London Borough of Camden, London Borough of Enfield, London Borough of Waltham Forest, London Borough of Islington, London Borough of Hackney
Harrow	London Borough of Harrow
Lewisham Consortium	London Borough of Lewisham, London Borough of Bromley, London Borough of Bexley
Greater Manchester	Bolton Council, Bury Council, Manchester City Council, Oldham Council, Rochdale Metropolitan Borough Council, Salford City Council, Stockport Metropolitan Borough Council, Tameside Metropolitan Borough Council, Trafford Council, Wigan Council
Nottingham	Nottingham City Council

Nuneaton & Bedworth Consortium	Nuneaton & Bedworth Borough Council, North Warwickshire Borough Council
Peterborough	Peterborough City Council
Plymouth	Plymouth City Council
South Buckinghamshire Consortium	Aylesbury Vale District Council, Buckinghamshire County Council, Cherwell District Council, Chiltern District Council, Cotswold District Council, London Borough of Ealing, Milton Keynes Council, South Buckinghamshire District Council, South Oxfordshire District Council, Three Rivers District Council, Vale of White Horse District Council, Watford Borough Council, West Berkshire Council, West Oxfordshire District Council, Wycombe District Council
Suffolk	Babergh District Council, Mid Suffolk District Council, Forest Heath District Council, St Edmundsbury Borough Council, Ipswich Borough Council, Suffolk Coastal District Council, Waveney District Council, Suffolk County Council
Telford & Wrekin	Telford & Wrekin Council
Woking and Surrey Consortium	Epsom & Ewell Borough Council, Elmbridge Borough Council, Guildford Borough Council, Spelthorne Borough Council, Waverley Borough Council, Reigate & Banstead Borough Council, Mole Valley District Council, Tandridge District Council, Runnymede Borough Council, Surrey Heath Borough Council, Surrey County Council, Woking Borough Council
Worcestershire	Bromsgrove District Council, Malvern Hills District Council, Worcester City Council, Redditch Borough Council, Wyre Forest District Council, Wychavon District Council, Worcestershire County Council

Green Deal Plans (headline and detailed releases)

The Green Deal Plan process

The Green Deal scheme has now been closed to new plans (installations and loans), though GD plans and measures statistics are still reported in the releases.

Green Deal Plans are reported at different stages (see below for more detail), based on all potential Green Deal Plans that are or have been in the system. It was

expected that all Green Deal Plans have a Green Deal Advice Report (GDAR); although some more recent 'new' Green Deal Plans may not have had an Occupancy Assessment lodged on the EPC register (as there was a 14-day window in which this must occur).

The data used comes from three sources – The Green Deal Central Charge Database and the NEC Software Solutions UK data (England & Wales) and Energy Savings Trust (Scotland). This allows verification checks that GD Measures are linked to a live or completed GD Plan.

Three stage reporting of Green Deal Plans

Uptake of the GD was below expectations and in July 2015 the Government announced there would be no further public investment in the scheme. The Framework to support the programme remained in place to service existing GD Plans and for any private finance providers wishing to enter the market. The Green Deal Finance Company – the vehicle created to finance GD loans and in which the Government ended public investment during 2015 – was purchased in January 2017 by new owners, who were offering new GD plans.

For those choosing Green Deal Finance, there were three stages in the life cycle of a Green Deal Plan for which reports were generated using data received from the Central Charge Database:

- the **first stage** (a 'new' Green Deal Plan) was after a customer has obtained a quote from a Green Deal Provider and confirmed they wished to proceed. The Green Deal Provider had then successfully requested a Green Deal Plan record prior to signature by the customer. It was possible that more than one Green Deal Plan may be requested for each household as the householder was able to request quotes from different Green Deal Providers. For statistical reporting purposes, only one Green Deal Plan per household was counted.

- the **second stage** (a 'pending' Green Deal Plan) was when a Green Deal Plan had been signed by the customer, progress was being made to install Green Deal Plan measures and the Plan was being finalised so that charging could start.

- the **final stage** (a 'live' Green Deal Plan) was after the measures had been installed in the property, the information required to disclose the Plan to future bill payers had been attached to the Plan and the energy supplier had all the information required to bill Green Deal charges. At this stage the daily charge had been confirmed along with the date from when the charge would be accrued on their electricity bill.

The Central Charge Database provides the latest status of each Green Deal Plan. This includes where a plan was 'Cancelled' – which are not included in our reporting – and 'Completed' Green Deal Plans when a Plan has been fully paid off.

In some cases, multiple Green Deal Plans have been recorded against an individual property. To ensure double counting does not take place only one Green Deal Plan

is counted against each unique property, with a Unique Property Reference Number being used to identify properties with more than one Green Deal Plan. The Green Deal Plan which is counted is the Plan at the furthest stage. For example, if a property has three Green Deal Plans recorded against it, one of which is 'cancelled', one of which is 'new' and one of which is 'pending', only the 'pending is counted and the other two are disregarded. Equally, if there are multiple Plans at the 'new' stage, 'pending' stage, or 'live' stage, then only the one at the most advance stage is counted.

The date at which GD Plans and measures are reported in these statistics is determined by the lodgement date of the post Green Deal installation EPC. Since the change of data supplier for England & Wales EPCs in September 2017, not all the EPCs are provided to DESNZ if a household opts out. In this scenario the measure will be counted if the GD Plan is live but will be classified based on the date in the GD Plan.

Volumes of finance of Green Deal Plans (detailed release)

The detailed release includes the estimated total initial loan amount associated with all 'live' and 'completed' Green Deal Plans. This is derived from the Green Deal Plan information found on the last page of the Energy Performance Certificate of the property. It is calculated using the daily charge multiplied by the length (in days) of the Plan. The daily charge is adjusted to remove the APR interest payment, which leaves just the 'total initial loan amount'.

Measures installed using Green Deal finance (detailed release)

The Green Deal scheme has now been closed to new plans (installations and loans), though GD plans and measures statistics are still reported in the releases.

The number of measures installed using Green Deal finance is based on data recorded on the Green Deal disclosure and information page of EPCs. These measures are reported against their month of installation. However, as the installation date of each individual measure is not known, the lodgement date of the post-installation EPC is used as a proxy. As stated above, since the change of data supplier for England & Wales EPCs in September 2017, not all the EPCs are provided to DESNZ if a household opts out. In this scenario the installation date will be classified based on the date of the GD Plan.

Measures are only reported in the headline Accredited Official Statistics release if the associated Green Deal Plan for those measures has been recorded as 'live' on the Central Charge Database before the end of the latest month. Therefore, measures associated with Green Deal Plans which have subsequently been paid off (i.e., 'completed' Plans which are no longer 'live') will be included as measures installed using Green Deal finance. Measures are not included if they have been reported as "not installed" on the Green Deal disclosure and information page of EPC or if the paid-off date for that measure is before the Green Deal Plan became

live, or within a few months of that date. These are considered as system errors and therefore should not be included as measures installed using Green Deal finance.

If a property has a ‘live’ and a ‘completed’ Plan, or multiple ‘live’ Plans, then only unique measures are counted (using the measures on the Plan with the latest EPC lodgement date). This is to ensure that there is no double-counting of measures installed using Green Deal finance.

The number of measures installed using Green Deal finance in earlier installation months are subject to revision as Green Deal Plans may become 'live' after the month of installation. The number of measures installed using Green Deal finance in any month other than the latest month are not directly comparable with the number of ‘live’ Green Deal Plans for each of those respective months. This is because some measures may have been installed in a month prior to when the corresponding Green Deal Plan went ‘live’.

Measures captured by administrative data sources (headline release)

The total number of measures installed in properties through the Energy Company Obligation is presented on a monthly basis with the same lag as with ECO measures to ensure completeness of data across the delivery mechanisms. This does not include measures installed but not captured by administrative data sources. A small number of these properties have had measures installed through more than one delivery mechanism and there is therefore a small level of double counting.

The number of measures installed through Green Deal Finance are based on the latest complete quarterly data. These will be updated on a quarterly basis (February, May, August, and November) in the headline release.

Households that have had measures installed and captured by administrative data sources (headline release)

The number of individual households with measures installed through the Energy Company Obligation is presented monthly with the same one-month lag as with ECO measures to ensure completeness of data across the delivery mechanisms. A small number of these properties have had measures installed through more than one delivery mechanism and there is therefore a small level of double counting.

Where a household has measures installed in two or more months, the earliest installation month is recorded.

The number of households with measures installed through Green Deal Finance Plans are based on the latest complete quarterly data.

Green Deal Home Improvement Fund (*discontinued series*)

On 23 July 2015 DECC announced that there will be no future funding releases of the Green Deal Home Improvement Fund. GDHIF closed for applications on 30 September 2015, and at the end of June 2016 the scheme closed.

GDHIF was an incentive scheme open to all householders in England and Wales wanting to improve the energy efficiency of their homes. The scheme allowed householders to choose one or both of two offers and they were eligible to claim up to £7,600. Householders could also claim a refund of up to £100 for a Green Deal Advice Report (GDAR). GDHIF release 1 closed to new applicants at 6:30pm on 24 July 2014. GDHIF release 2 commenced on 10 December 2014 and GDHIF release 3 commenced on 16 March 2015. For more information, please see the GDHIF website. For more information on the separate scheme that operated in Scotland please see the relevant website.

GDHIF application release 1 data were published on the gov.uk website on a weekly basis until the scheme closed, to assist businesses and households. This weekly series reported the number of applications, vouchers issued, and maximum value of vouchers issued. Also included on a weekly basis from 17 December 2014 until 7 January 2015 (on the same website) were GDHIF application statistics on GDHIF release 2. A one-off publication was made on 12 December to show that funding allocated to Solid Wall Insulation applications reached its maximum allocation amount. Also included on a weekly basis from 24 March 2015 (on the same website) were GDHIF application statistics on GDHIF release 3. A one-off publication was made on 26 March 2015 to show that funding allocated to Solid Wall Insulation applications reached its maximum allocation amount.

A GDHIF issued voucher (following an application) could be for one or more measure for any given property. In a small number of cases more than one voucher was paid per household. The headline release reports the absolute numbers for GDHIF vouchers paid, their associated value and measures installed through GDHIF, based on record-level data from the GDHIF Administrator. Also reported are the number of GDHIF applicants that had received a Green Deal Assessment Report (GDAR) refund (of up to £100 each) and/or received the Home Buyer Bonus (of up to £500 each). However, the number of GDHIF active applications[5] and vouchers issued[6] and associated budget committed are only reported at an aggregate level as the same level of disaggregation in that data was not received.

The detailed report includes the number of unique households in receipt of GDHIF measures by region, administrative area, Parliamentary Constituency, and tenure. Geographic locations of properties receiving GDHIF payments are taken from application data and details on the Energy Performance Certificate (EPC) of the

[5] GDHIF active applications include any vouchers issued, pending, or vouchers which have been paid. It excludes any vouchers which have been cancelled, rejected, superseded or claim failed. Vouchers issued are reported against the month in which they were issued.
[6] There may have been several vouchers issued for a single application where a customer has modified key elements of their application.

property. The tenure of the householders of these properties is taken from EPC data, unless this data is missing, in which case the tenure is taken from the GDHIF application data.

Upgrading one million homes target, (May 2015 – April 2020) (discontinued series as target period finished)

Until September 2017, the Statistical Release reported on the one million homes target set for the 2015 Fixed term Parliament, which was due to run until April 2020. Reporting was revised in December 2017 to reflect the Government's manifesto commitment on home energy efficiency and the Clean Growth Strategy published in October 2017.[7] Reporting is still set-in terms of upgrading around one million homes through the Energy Company Obligation (ECO) and other Government domestic energy efficiency schemes. The difference, however, is that all measures (for example insulation and heating measures) available under those schemes are included when previously only insulation measures were included. The period covered is the same five years as before, from the start of May 2015 through until the end of April 2020.

The ECO and Green Deal framework consist of a group of packages which all enable energy efficiency measures to be installed. This note explains exactly which delivery mechanisms are contributing towards the one million homes target.

For clarity, the table below breaks down all the different delivery mechanisms, whether they are included or not, and other points to note. This list of delivery mechanisms will be reviewed in the light of any further policy announcements and is therefore subject to change.

Households that had upgrade measures installed through more than one delivery mechanism are only counted once to avoid any double counting. The usual methodology is applied to remove duplicates, using record level address data. This ensures all homes/properties contributing towards the target are **unique individual properties**. As address matching is not 100% accurate/comprehensive, there is a small level of uncertainty, and future revisions are possible.

One of the key components towards the target is ECO. All ECO measures must be approved by Ofgem (with some measures only available as a secondary measure under CERO). All measures for ECO up to the end of ECO Help-to-Heat (to September 2018) have been approved. The metric also includes ECO3 measures installed from October 2018 until the target end date of the end of April 2020.

Progress against the one million homes target has been reported on a regular basis, as part of the Household Energy Efficiency – Headline release, from March 2016

[7] Clean Growth Strategy: Page 13 https://www.gov.uk/government/publications/clean-growth-strategy "Support around £3.6 billion of investment to upgrade around a million homes through the Energy Company Obligation (ECO), and extend support for home energy efficiency improvements until 2028 at the current level of ECO funding."

onwards. The progress towards the one million homes target was revised and published for the final regular update in November 2020 and will only be subsequently updated if there is a significant revision to the raw scheme data.

Summary
Period covered = Measures installed between 1st May 2015 – 30th April 2020 (inclusive)

All measures installed through the following delivery mechanism = ECO (includes ECO2, ECO HTH and ECO3), Green Deal Home Improvement Fund, and Green Deal Finance Plans.

Delivery mechanisms which contribute towards the 1 million homes target

Delivery mechanism	Currently Included	Included in future	Not Included	Notes
ECO2 measures	Yes	Yes	Any rejected or withdrawn ECO measures will be excluded and not counted towards the target.	ECO2 measures remain provisional until finalised in 2019. Funds being managed from fines placed on suppliers by Ofgem following failure to comply with CERT/CESP will be considered.
ECO Help-To-Heat measures	Yes	Yes, From April 2017 – September 2018	Any rejected or withdrawn measures will be excluded.	ECO HTH measures remain provisional until finalised in 2019.
ECO3 measures	Yes	Yes, from October 2018 to April 2020.	Any rejected or withdrawn measures will be excluded.	
Green Deal Home Improvement Fund	Yes	Yes, until the end of scheme in June 2016.		
Green Deal Finance Plans	Yes	Yes		Measures will be included for “Live” Plans or “Completed” Plans that have been paid off in full.

Scotland Green Homes Cashback Scheme / HEEPS	No	If DESNZ receive record level data, then these can be included if these are additional unique properties.	Welsh scheme Arbed, as this was completed before May 2015.	Green Homes Cashback statistics Energy Saving Trust HEEPPS Cashback Statistics (opens in new window) Little additionality is expected from these schemes as most will be blended with ECO.
Green Deal Communities	Yes	Where there is additionality under this scheme then these have been included.	There is a large overlap between GD Communities and ECO/GD, and these properties have been excluded.	
Alternative finance measures following a Green Deal Assessment	No	No accurate record level data to base this number on.		Evidence suggests there are not many of these that were fully funded outside of ECO and Green Deal.

Households with at least one usual resident (headline and detailed releases)

Several geographical tables (region, administrative area, and Parliamentary Constituency) in the detailed release include a breakdown by number of measures delivered by household (for example, households in receipt of ECO measures per 1,000 households). To produce these, the number of households is obtained from several sources.

Region

For regions in England the areas below are summed from ONS Table 406 (details below), the total for England is also taken from this table. For Wales and Scotland, the total figure is taken from the tables detailed below. Rounding of data may mean some totals do not tally to their components.

Administrative area

- **England**, Households with at least one usual resident per local authority, mid-2025, in England. This was sourced from Office for National Statistics 2022-based household projections for England. That data can be found in Table 406 of the 2022-based household projections at the following hyperlink. Note: the 2023 Local Authority Geographies Edition of the dataset was used to cover those authorities created as at 1 April 2023 (for Sheffield and Barnsley, the estimated number of households with at least one usual resident is still based on pre-April 2025 geography boundaries): https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland

- **Wales,** Households with at least one usual resident per local authority, mid-2025, in Wales. This was sourced from the Welsh Government's 2022-based household projections for Wales. That data (principle projection of Total Households for mid-year 2025) can be found at the following hyperlink: https://stats.gov.wales/en-GB/a2102ed7-52ff-4f58-a7eb-750b06bb8fa8

- **Scotland**, Households with at least one usual resident per local authority, mid-2025, in Scotland. This was sourced from National Records of Scotland 2022-based household projections for Scotland. That data (Detailed Tables, Principal Tables, by council area) can be found in Table 6 of the downloadable household-projection data at the following hyperlink: https://www.nrscotland.gov.uk/publications/household-projections-for-scotland-2022-based/

Parliamentary Constituency

For Parliamentary Constituencies the date sources used are:

- England and Wales, Office for National Statistics 2021 Census estimates that classify all households in England and Wales by household size. The estimates are as at census day, 21 March 2021 (opens in new window)

- Scotland, Scotland's Census 2022 - National Records of Scotland, Table UV406 (opens in new window) - Household size, all occupied household spaces, United Kingdom Parliamentary Constituency 2024, households.

Estimating carbon and energy savings (headline and detailed release)

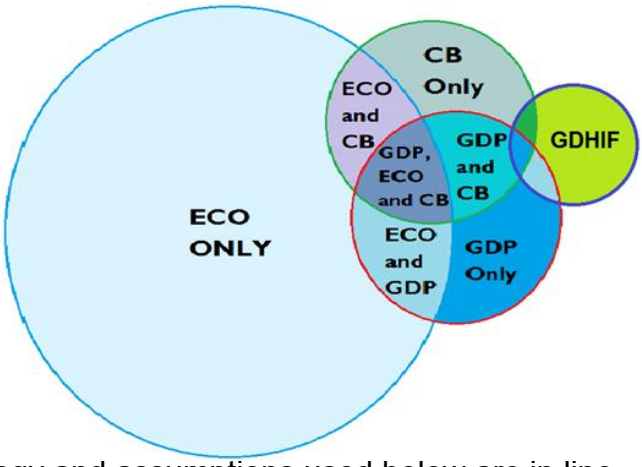
This section summarises the methodology used to produce estimates of lifetime carbon and energy savings derived from the domestic GD/ECO. Given there are some measures that overlap between the different schemes the total savings are presented as an upper bound of the possible range of impact.

As ECO4 register development is still ongoing, carbon and energy savings derived from ECO4 measures will be published in due course.

This difficulty in segregating the impact from the various installation routes is exemplified in the following illustration, which shows the various overlaps involved. If other schemes such as Pioneer Places and Core Cities were considered, this would only increase further the number of various combinations in which installations should be considered. We acknowledge these overlaps would create an overestimation of impact if the impact estimated across each installation route were simply added together, hence a range is presented. There should not be any interaction between ECO and GDHIF as shown in the Venn diagram below.

Venn diagram key:

CB = Cashback
GDP = Green Deal Plans
ECO = Energy Company Obligation
GDHIF = Green Deal Home Improvement Fund



To determine the scale of impacts, the methodology and assumptions used below are in line with the approach taken in the GD/ECO final Impact Assessment. They differ to those methods used to assess Energy Company compliance against their ECO targets, where reductions in carbon/energy savings for comfort taking are not applied.

Estimating carbon and energy savings for ECO measures

There are three obligations within ECO, two of which (CERO and CSCO) report estimated lifetime carbon saving based on SAP or the deemed scores model used to assess the contribution of each measure to the obligation target. Affordable Warmth (HHCRO) reports differently, it is based on estimated lifetime energy bill saving because of the measures installed.

From October 2019, a process for estimating the lifetime energy and carbon savings from the deemed energy bill saving has been developed. This has been done by dividing the assumed bill saving by the price of the main heating fuel for each phase of the ECO obligation. This simplified approach can be applied in 99% of Affordable Warmth measures where fuel switching is not involved. The derived energy and carbon savings for Affordable Warmth exclude measures with fuel switching. Where an uplift (for example for innovation measures)

has been applied to the deemed score, this will be removed when deriving the energy and carbon savings of the measure.

The deemed scores model was produced by the Buildings Research Establishment (BRE) with price assumptions taken in the months preceding the start of each ECO phase.

Table 1: Summary of price assumptions (main fuels only): £/MWh

Heating fuel	ECO 1	ECO 2	ECO HTH	ECO 3
District heating	30	36	37	34
Electric	132	148	153	166
Electric storage heaters	55	65	69	76
Gas	35	42	43	39
LPG	103	108	104	105
Oil	54	58	51	38

Where the deemed score is for a broken boiler, this would assume that an alternative heating method, such as electric room heaters, is used. This would assume the saving is electricity. For this analysis only the carbon savings of broken boilers have been assumed to be the same as a boiler upgrade (i.e., they reflect the savings that would be realised just before the existing boiler broke down). The savings have been imputed from the ECO3 scores for boiler upgrades but have been adjusted to reflect the prices for earlier ECO phases and evidence from the National Energy Efficiency Data framework (NEED) that higher savings for boilers were achieved in earlier years of boiler replacement.

Table 2: Broken boiler impact adjusted based on NEED evidence

Uplift applied to broken boilers based on NEED evidence of savings reducing by year of installation	Uplift
ECO 1 (January 2013 – March 2015)	1.40
ECO 2 (April 2015 – March 2017)	1.23
ECO HTH (April 2017 – September 2018)	1.18
ECO 3 (October 2018 - present)	1.00

The carbon savings derived for CERO & CSCO apply in-use factors[8] for carbon and energy savings relating to ECO measures. For consistency, these in-use factors have been applied when bill savings from HHCRO are converted into energy and carbon savings.

Table 3: Summary of in-use factors for carbon & energy savings

Category	Items	In use factor (% reduction)
Wall insulation	Cavity wall insulation (including where internal or external wall insulation is applied to a cavity wall	35%
	Internal or external wall insulation for solid brick walls built after 1967 (England and Wales) or 1965 (Scotland)	25%
	Internal or external wall insulation for solid brick walls built before 1967 (England and Wales) or 1965 (Scotland)	33%
	Internal or external wall insulation for solid, non-brick walls	25%
	External wall insulation for park home walls	25%
Other Insulation	Loft insulation (rafter or ceiling) or passageway walk-through doors	35%
	Window glazing, high performance external doors, hot water cylinder insulation, under floor insulation, flat room insulation, room in roof insulation or draught proofing	15%
	Park home insulation (floor or roof)	35%
Boiler	First time central heating	35%
	Boiler repair or replacement (gas or non-gas), with or without pre-existing heating controls	35%
Other heating	Electric storage heater (installation, upgrade, replacement, or repair)	5%
	District heating connections (all generator types)	10%
	Heating controls (smart or conventional)	50%
	Radiator panels	25%

[8] Ofgem ECO measures https://www.ofgem.gov.uk/ofgem-publications/83100/energycompaniesobligation-measures.pdf and ECO2t https://www.ofgem.gov.uk/publications-and-updates/eco2t-measures-table

	Flue gas heat recovery device, heat recovery ventilation, radiator panels or warm air units	5%
Micro Generation	Air source heat pumps, biomass boilers, ground source heat pumps, micro combined heat and power, micro hydro, micro wind, or photovoltaics	5%

Estimating carbon savings for GD Cashback measures

As Cashback payments are dependent on a second EPC being lodged, a calculation of the estimated carbon improvement derived from the installation of a Cashback measure can be calculated (by subtracting the estimated current CO_2 emissions value in the second EPC from the estimated current CO_2 emissions value in the original EPC). The estimated current CO_2 emissions value is stated as in-year carbon tonnes, so a further calculation is required to ensure estimated savings are aligned with lifetime estimated carbon savings from ECO measures.

In year carbon saved ($MtCO_2$) = Current estimated CO_2 emissions value (as reported in second EPC) – original estimated CO_2 emissions value (as reported in original EPC)

Lifetime CO_2 saving (years) = In-year carbon saved x lifetime of measure – comfort taking – in-use factor

Additionality of Cashback

The calculations for carbon saving have taken into consideration the additionality of Cashback, specifically with regards to boiler replacements (i.e., would customers have had a new boiler installed even if there was no cash incentive). A 2011 evaluation of the boiler scrappage scheme included a survey which investigated if people were genuinely triggered to make the decision to replace their boiler or whether an existing decision was brought forward. The evaluation estimated that boiler replacements were brought forward on average 1.4 years per successful voucher. The same assumption is made for heating controls and flue gas heat recovery devices. This estimate has been included in our own analysis to give a better approximation of the additional effect upon estimated carbon and energy savings that Green Deal Cashback has had on boilers.

Multiple Cashback measures

Where multiple Cashback measures were installed, an estimated apportionment of the CO_2 is required. There were only 822 such instances where this occurred up to end September 2014, and it has been approximated that the total in-year carbon saved would be split evenly across the multiple measures installed.

Behavioural Change

Consistent with the Green Deal/ECO final Impact Assessment, the estimated lifetime carbon saving is reduced to account for behavioural change following the installation of measures. Previous supplier obligations and theory suggest that householders will tend to increase their

energy use by approximately 15%[9] after installing energy efficiency measures to benefit from a warmer temperature within their home (comfort taking); accordingly, this factor is applied to the calculation of estimated savings (to reduce the estimated lifetime saving), given that the estimated CO_2 emissions value used in the calculation does not capture behavioural change.

Accounting for missing values

A further approximation involves the estimated carbon saving improvement across those properties where either the current or original estimated CO_2 emissions value (or both) were missing. This occurs in roughly six per cent of cases.

In these instances, the following methodology has been applied:

1. Where the original estimated CO_2 emissions value is known but the current estimated CO_2 emissions value is not, regress the relationship between current CO_2 emissions and estimated savings from those properties that have both before and after estimates, to impose a value onto the missing observation.

2. Where the current estimated CO_2 emissions value is known but the original estimated CO_2 emissions value is not, regress the relationship between original CO_2 emissions and estimated savings from those properties that have both before and after estimates, to impose a value onto the missing observation.

If neither the original estimated CO_2 emissions value nor the current estimated CO_2 emissions value is known, the average estimated carbon saving improvement per measure (as calculated from Cashback measures that have a value for estimated CO_2 emissions) was applied to give a better approximation for the likely impact that the measure had.

Estimating annual energy saving for GD Cashback measures

Alongside estimated carbon savings, an estimated annual energy saving value must be calculated:

Annual estimated energy saving (KWh) = (tCO_2 saving x1000)/Carbon intensity of fuel type

To note, the SAP carbon intensity series[10] was used in this calculation as it is the series used in the RdSAP calculations. This is then converted into lifetime energy saving (KWh).

Lifetime energy saving (KWh) = Annual estimated energy saving x lifetime of measure

Regarding the carbon intensity factor, it has been assumed that all Cashback measures were installed into gas fuelled properties – this is since virtually all Cashback measures were boiler replacements. This assumption impacts on the estimated energy savings of measures installed, as it is calculated by converting from estimated carbon savings by the carbon intensity of gas only. Also, all carbon and energy savings relating to measures installed

[9] Explanation of comfort taking is found in the Final Stage Impact Assessment for the Green Deal and Energy Company Obligation, page 158. The assumed comfort taking impact of 15% is consistent with the analysis that underpinned this Impact Assessment.
[10] The Government's Standard Assessment Procedure for Energy Rating of Dwellings, 2009 edition incorporating RdSAP 2009 http://www.bre.co.uk/filelibrary/SAP/2009/SAP-2009_9-90.pdf Table 12, p199

through Cashback are adjusted by the relevant in-use factors for each measure type[11] from the March 2015 detailed release.

Estimating annual energy saving for GDHIF measures

The method for calculating the lifetime carbon savings from Green Deal Home Improvement Fund (GDHIF) is similar to that used for Cashback (details above). As with the estimates for that scheme, EPC data is used to calculate the annual carbon saving per household and multiply this by average measure lifetimes to obtain aggregate figures. Also, in keeping with the Cashback method, the savings by measure are calculated by disaggregating the household level savings and summing these across measure types. However, because of take up patterns for GDHIF, and data availability, there are differences.

The two key differences are:

1. Only a very small percentage of redeemed GDHIF vouchers have both a pre- and post-installation EPC, compared to 95% of installations under Cashback.

2. A large percentage of measures were either Solid Wall Insulation (SWI), or Condensing Gas Boilers (Boilers) with Flue Gas Heat Recovery Units (FGHR), or both. The measures installed using Cashback are more diverse with a significant number of households installing loft, cavity, and other insulation (although boilers do account for most installations).

Also, all carbon and energy savings relating to measures installed through the GDHIF are adjusted by the relevant in-use factors for each measure type[12] from the March 2015 detailed release.

Estimating annual carbon savings at household level

In general, the steps for calculating the lifetime CO_2 savings per household are as follows:

1. Lifetime CO_2 saving (years) = In-year carbon saved x lifetime of measure – comfort taking – in-use factor

Calculations based on pre – installation EPC

In all cases it is necessary to estimate the CO_2 savings because it is assumed no post installation EPC has been lodged. This is done by multiplying initial carbon emissions with a parameter that predicts carbon savings based on this initial amount.

These parameters are estimated by regressing households' CO_2 savings on their pre-installation emissions (in records where there is both a pre- and post-installation EPC). Data for the regressions comes from Cashback - depending on the measure package installed and data availability.

[11] Domestic measures in-use factors, page 9
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48407/5505-how-the-green-deal-will-reflect-the-insitu-perfor.pdf
[12] Domestic measures in-use factors, page 9
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48407/5505-how-the-green-deal-will-reflect-the-insitu-perfor.pdf

Cases where the pre installation EPC are missing

In a small percentage of cases there is no pre-installation EPC information on which to base our CO_2 saving estimate. In these instances, standard assumptions are used for the energy savings obtained from different measures.[13] Also, all carbon and energy savings relating to measures installed through GDHIF are adjusted by the relevant in-use factors for each measure type[12] from the March 2015 detailed release.

Disaggregating Carbon Savings and Energy Savings

As above, CO_2 savings data is available (or estimated) by property, but not by individual measure. For the purposes of obtaining total carbon saved under the scheme split by measure type, it is necessary to disaggregate the savings for households that have had more than one measure. The average annual CO_2 savings of different measures is assigned equally across the number of measures installed where two or more are installed as part of a package. Furthermore, where a household has had multiple vouchers paid, the carbon saving per household for these particular households is divided by the total number of measures assigned to all vouchers, to ensure carbon savings are not being included more than once.

The same method for estimating annual energy saving is used in Cashback and GDHIF. Therefore, it has been assumed that all measures were installed into gas fuelled properties. This assumption impacts on the estimated energy savings of measures installed, as it is calculated by converting from estimated carbon savings by the carbon intensity of gas only.

Additionality of GDHIF

As with Cashback, the calculations for carbon savings have considered the additionality of the insulation measures, specifically about boiler replacements, and in the case of GDHIF, FGHR. For more details see ‘Additionality of Cashback’ section above.

Behaviour change

A standard adjustment of 15% is applied to account for comfort taking.

Estimating annual energy saving for GD Plan measures

The same methodology is applied here as for Cashback measures. Currently, it includes the carbon impact of measures installed where there has been an ECO presence or a GD Cashback claim raised, or both. Accordingly, the estimated impact cannot be simply added together for the reasons given above. In this methodology it is assumed the properties are gas fuelled (unless the specific measure is known to impact on different energy types, such as Solar PV impacting on electricity use).

Also, all carbon and energy savings relating to measures installed through GD finance Plans are adjusted by the relevant in-use factors for each measure type from the March 2015 detailed release.

[13] See table 49 in https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf

Home insulation levels in Great Britain (detailed release)

This section of the detailed release presents estimates of the number of homes in Great Britain with loft, cavity, and solid wall insulation. It gives estimates for the number of properties with each insulation measure installed. It also sets out the remaining potential for insulation in dwellings in Great Britain.

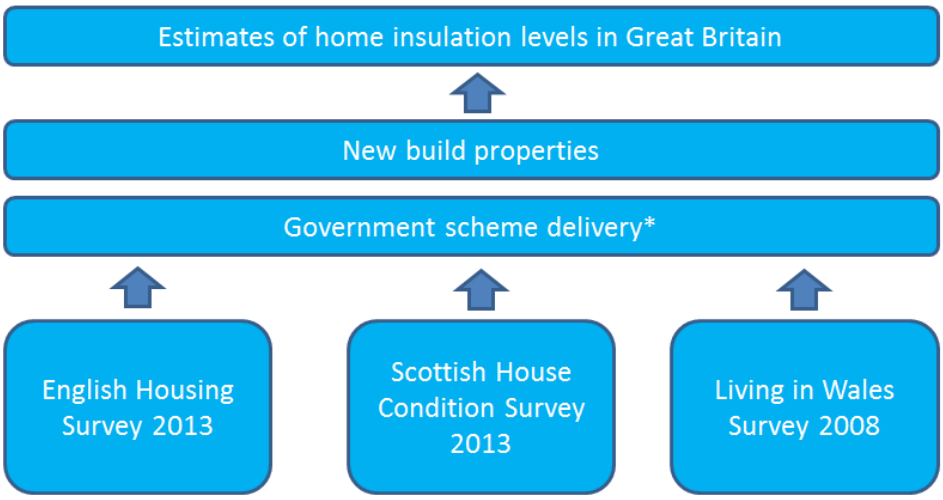
Changes to methodology

Estimates of insulation levels were re-based to April 2013 to reflect more up to date information available in the English and Scottish Housing Surveys. The following methodology outlines the approach based on the new methodology. The changes to methodology, September 2016 section of this note summarises the changes.

Summary of overall approach

April 2013 housing survey data is used as a baseline for England and Scotland, to estimate the number of properties with cavity wall insulation, solid wall insulation and loft insulation. For Wales, the April 2008 housing survey is used since there had not been a property survey carried out by a surveyor after that point – delivery through Government schemes is therefore added to the April 2008 Living in Wales survey data, to form the April 2013 baseline. Installations of cavity wall insulation, solid wall insulation and loft insulation through Government schemes and the estimates of properties with insulation from the building of new homes are then added to the April 2013 baseline on a quarterly basis.

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



*For England this includes delivery under Carbon Emissions Reduction Target (CERT), Community Energy Savings Programme (CESP), Warm Front, ECO, GD Finance Plans, Cashback, GD Communities, GHGV, GHGLAD, HUG, SHDF, GBIS and the Green Deal Home Improvement Fund.[14]
For Scotland this includes delivery under CERT, CESP, ECO, GBIS and GD Finance Plans.
For Wales this includes delivery under CERT, CESP, Arbed, ECO, GBIS, GD Finance Plans, Cashback, and Green Deal Home Improvement Fund.

[14] As there is a large overlap between ECO measures and GD communities' measures, this only includes measures which were not funded under ECO or other GD finance.

2013 baseline

Cavity wall insulation

April 2013 housing survey data is used for the baseline for England and Scotland, and 2008 housing survey data for Wales for the estimated number of properties with cavity wall insulation. As stated earlier in this note, there had not been a property survey carried out by a surveyor since 2008 in Wales, which is why 2008 Living in Wales (LiW) survey is used. Government scheme delivery between April 2008 and March 2013 is then added to the 2008 LiW figures to obtain the 2013 baseline.

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

English Housing Survey

The English Housing Survey (EHS)[15] is an annual survey commissioned by MHCLG. 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 2012-13 and 2013-14 are referred to by the mid-point of April 2013. April 2013 results are based on a sample of 12,498 (occupied or vacant) dwellings. Figures from the EHS have been scaled so that the total number of properties matches the total dwelling stock figures for England published by MHCLG[16].

Scottish House Conditions Survey

The Scottish House Conditions Survey (SHCS)[17] 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 so that the total number of properties matches the total dwelling stock figure for Scotland published by MHCLG. 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 so that the total number of properties matches the total dwelling stock figure for Wales published by MHCLG. 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. There has not been a property survey carried out by a trained surveyor conducted since 2008 for Wales so these insulation estimates continue to use 2008 as the baseline, whereas England and Scotland use the 2013 housing survey data as a baseline. Delivery of

[15] http://www.communities.gov.uk/housing/housingresearch/housingsurveys/englishhousingsurvey/
[16] http://www.communities.gov.uk/housing/housingresearch/housingstatistics/housingstatisticsby/stockincludingvacants/livetables/
[17] http://www.scotland.gov.uk/Topics/Statistics/SHCS

cavity, solid wall, and loft insulations in Wales through Government schemes between April 2008 and end of March 2013, is added to the 2008 housing survey data to form the 2013 baseline.

Categorising properties

Cavity wall insulation figures taken from each of the housing surveys are then categorised into one of the following three categories (including a split by easy and hard to treat properties for “remaining potential”).

Table 4 below shows how properties are allocated to each of the three categories for the 2013 baseline.

Table 4: Classification of cavity wall properties (2013 baseline)

Category	Description	Country		
		England	Wales	Scotland
Insulated	Properties with cavity wall insulation.	All properties classified as having cavity wall insulated on the EHS 2013(+ additional 5% for unobserved insulation as recommended by the organisation that conducted the survey).	All properties classified as having cavity wall insulated on the LiW 2008 survey (+ additional 5% for unobserved insulation as recommended for England). Plus, cavity wall insulation measures delivered under Government schemes between April 2008 and March 2013.	All properties classified as having cavity wall insulated on the SHCS 2013 (+ additional 5% for unobserved insulation as recommended by for England).
Uncertainty	Properties which may or may not have cavity wall insulation.	This category is made up of 5% of properties recorded as insulated on housing surveys (for property age bands outside of 1986 to 1995), due to 5-10 per cent under reporting recommendation by BRE. 5% of properties built between 1986 and 1995 are assigned based on NHBC data as outlined in the changes to methodology section of this note (and are therefore not categorised as “uncertainty”).		
Not insulated	Properties with no cavity wall insulation.	Remaining cavity wall properties i.e., 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., 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 2013 housing survey data as a baseline for England and Scotland, and 2008 housing survey data for Wales. As stated earlier in this note, there had not been a property survey carried out by a surveyor since 2008 in Wales, which is why 2008 Living in Wales (LiW) survey is used. Government scheme delivery between April 2008 and March 2013 is then added to the 2008 LiW figures to form the 2013 baseline.

Categorising properties

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

- Insulated – properties with 125mm of loft insulation or more.
- Easy to treat – properties with an easy to treat loft.
- Hard to treat – properties with issues that might prevent it receiving standard loft insulation which therefore make it hard to treat, for example remedial and access issues, and external features including roof covering.
- No loft – properties which do not have a loft.

Table 5 below shows how properties are allocated to each of the four categories for the 2013 baseline. It should be noted that categorisation of properties reflects the state in most of the property (as coverage may not be uniform across the whole loft space – due to hatches, boarding, eaves, extensions, etc.).

Table 5: Classification of loft insulation

Category	Description
Insulated	Properties recorded in each of the property surveys as having 125mm or more of loft insulation. In addition, for Wales, properties with loft insulation installed under Government schemes between April 2008 and March 2013.
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 which makes 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 April 2013 housing survey data as a baseline for England and Scotland, and 2008 housing survey data for Wales. As stated earlier in this note, there had not been a property survey carried out by a surveyor since 2008 in Wales, which is why 2008 Living in Wales (LiW) survey is used. Government scheme

delivery between April 2008 and March 2013 is then added to the 2008 LiW figures to form the 2013 baseline.

Categorising properties

- Insulated
- Not insulated

Table 6 below shows how properties are allocated to each category for the 2013 baseline.

Table 6: Classification of solid wall properties

Category	Description
Insulated	Properties recorded in each of the property surveys as having solid wall insulation in the housing surveys. This is based on the housing survey definition of insulation and may include some properties with cladding.[18] In addition, for Wales, properties with loft insulation installed under Government schemes between April 2008 and March 2013.
Not insulated	Properties recorded in each of the property surveys as having solid walls with no insulation.

Sources of increase in insulation levels

Insulation measures installed since April 2013 are estimated based on administrative data from Government schemes and data on new build properties published by MHCLG, Welsh Government and Scottish Government. The section below outlines how these data are added to the April 2013 baseline figures to give current estimates, the Government schemes included in this release and how newly built homes are classified.

Cavity wall insulation

Cavity wall insulation delivered through Government schemes is added to the "insulated" category on a quarterly basis, and the equivalent number is taken from the "remaining potential" category. The remaining potential category is split by easy and hard to treat properties, and these categories are taken from according to whether the insulation was installed into an easy to treat or hard to treat cavity – this is defined in the measure description field of the Government scheme data. Under ECO Help-to-Heat, ECO3 and ECO4 there is no specific measure type for a hard-to-treat cavity wall insulation that does not use Solid Wall Insulation. It is assumed that cavity wall insulation listed with a thermal conductivity (lambda value) of 0.027 W/mK is a hard-to-treat cavity solution. For cavity wall insulation measures installed under GHGV, LAD, HUG, SHDF and GBIS, these are assumed to be easy to treat cavities, as the scheme administrative data does not hold further details on the measure description or the cavity filled, so the estimates may slightly overestimate the number of easy to treat cavity wall properties insulated. In addition, new build figures are added to the

[18] The energy improvements delivered by solid wall insulation vary considerably depending on the precise construction and thickness of the original wall (e.g., single leaf brick, 9-inch brick, stone, or concrete). External solid wall insulation is applied by fixing insulating boards to the outside of the building and covering them with a weatherproof render and sometimes false stone or brick cladding.

"insulated" category. The 'Government Schemes' section of this note outlines in more detail the Government schemes included in these estimates.

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 "remaining potential" category. The remaining potential category is split by easy and hard to treat lofts, and these categories are taken from according to whether the insulation was installed into an easy to treat or hard to treat loft as defined in the measure description field of the Government scheme data. Virgin loft insulation (where a loft has no existing loft insulation) and top-up loft insulation are taken from the remaining potential easy to treat category. The following types of loft insulation are taken from the remaining potential hard to treat category: flat roof insulation, room in roof insulation, insulation at rafters, insulation at joists park home lofts and pitched roof. 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 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 these estimates.

Solid wall insulation

Each quarter solid wall insulation (internal and external) delivered through Government schemes is added to the "insulated" category and the equivalent number is taken from the "not insulated" category. Some park homes under ECO have received external wall insulation. These measures have been 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 these estimates. 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, but it is not currently possible to differentiate these (except for ECO) so the estimates may slightly overestimate the number of solid wall properties insulated.

Government Schemes

Measures installed since April 2013 through the following policy programmes are included in these estimates. It should also be noted that additional schemes' data are included for Wales due to there being no housing survey conducted since 2008, which means additional Government scheme delivery has been included to make up the April 2013 baseline (as described earlier on in the methodology note).

- **The Carbon Emissions Reduction Target (CERT):** CERT began in April 2008 and finished in December 2012. However, there were some measures installed as mitigation actions between April 2013 and June 2013 which have been included as measures installed under Government schemes since April 2013. CERT required all domestic energy suppliers with a customer base more than 250,000 customers (increased from 50,000 at the end of December 2011) to make savings in the amount of CO_2 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 was regulated by Ofgem, who reported supplier progress towards their

CERT target in summary form on a quarterly basis and provided a more extensive annual review of the scheme.[19]

- **Warm Front:**[20] The majority of Warm Front delivery occurred before April 2013 (the scheme closed to new applicants in January 2013) and is therefore covered in the housing survey data. However, there was a small number of improvements between April 2013 and December 2013 that have been included as measures installed under Government schemes since April 2013. The Warm Front scheme provided heating and insulation improvements to households in England that received certain income-related benefits while 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, in addition to 50% of loft insulation that had been installed into lofts which previously had no insulation.

- **Community Energy Saving Programme (CESP):**[21] The CESP scheme finished in December 2012. However, there were some measures installed as mitigation actions between April 2013 and September 2013 which have been included as measures installed under Government schemes since April 2013. 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 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.

- **Energy Company Obligation (ECO):**[22] 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 2026 (under ECO4). It replaced CERT and CESP, with a focus on providing energy efficiency measures to low income and vulnerable consumers, as well as those living in hard-to-treat properties. Further information on ECO can be found in the ECO section of this methodology note.

- **Green Deal:**[23] The Green Deal was launched on 28 January 2013 in England and Wales (and on 25 February in Scotland) to tackle several key barriers to the take-up of energy

[19] https://www.ofgem.gov.uk/environmental-programmes/eco/overview-previous-schemes
[20] https://www.gov.uk/government/publications/2010-to-2015-government-policy-household-energy/2010-to-2015-government-policy-household-energy#appendix-4-warm-front-scheme
[21] https://www.ofgem.gov.uk/environmental-programmes/eco/overview-previous-schemes
[22] https://www.gov.uk/government/policies/helping-households-to-cut-their-energy-bills/supporting-pages/energy-companies-obligation-eco
[23] https://www.gov.uk/green-deal-energy-saving-measures

efficiency measures. There are several mechanisms under which homeowners could take advantage of the Green Deal Framework to install measures - these include Green Deal Finance, Cashback, Green Deal Home Improvement Fund (GDHIF) and Green Deal Communities. Further information on Green Deal Finance can be found in the Green Deal section of this methodology note. The GDHIF and Cashback schemes have now ended, but these schemes were incentive schemes open to all householders in England and Wales wanting to improve the energy efficiency of their homes. Green Deal Communities ran until the end of September 2016.

- **Green Homes Grant Vouchers (GHGV):** the GHGV scheme launched for applications on 30th September 2020 and closed to new applicants on 31st March 2021. All applications in the system at that date were processed by the scheme delivery partner. Vouchers issued under the scheme had to be used within three months. It was available in England only. Householders and landlords could apply for a grant of up to £10,000 to cover the cost of installing energy efficiency measures. The scheme was split into a main scheme and a low-income scheme, which was determined by the receipt of certain benefits. Applicants on the main scheme would receive up to two-thirds of the cost of the retrofit up to a value of £5,000, while low-income applicants would be fully funded up to £10,000. In estimating insulation levels across Great Britain, the number of cavity wall, solid wall and loft insulation measures are included in the model. For cavity and solid wall insulation, all measures are assumed to be easy to treat due to the lack of more detailed information. For loft insulation, the breakdown of loft, flat roof, pitched roof and room-in-roof insulation measures are recorded and included. Further information on the scheme is available in the official statistics[24] and GHGV guidance[25].

- **Green Homes Grant Local Authority Delivery (GHG LAD):** the LAD scheme launched in 2020 with £500 million of funding to support the energy efficiency upgrades of low-income households across England. LAD is delivered over different phases, with Phase 1 allocating £200m in grants to over 136 Local Authorities (LAs) for delivery by March 2022. Phase 2 allocated £300m in grants to the five Local Net Zero Hubs, who will work with their regional Local Authorities. Under the scheme, LAs identify households that meet the eligibility criteria for the scheme - these are targeted as those most at risk of fuel poverty or in the least energy efficient housing. For cavity and solid wall insulation, all measures are assumed to be easy to treat, due to the lack of more detailed information. For loft insulation, the breakdown of loft, flat roof, pitched roof and room-in-roof insulation measures are recorded and included. Further information on the scheme is available in the official statistics[26].

- **Sustainable Warmth (SW):** the scheme launched in early 2022 to further support the energy efficiency upgrades of low-income households across England. SW consists of LAD Phase 3 and the Home Upgrade Grant (HUG) Phase 1. LAD Phase 3 has allocated £287 million funding to Local Authorities to support low-income homes on the gas grid, whilst HUG Phase 1 has allocated £152 million funding to Local Authorities to support low income homes off the gas grid. For cavity and solid wall insulation, all measures are assumed to be

[24] https://www.gov.uk/government/collections/green-home-grant-statistics
[25] https://www.gov.uk/guidance/apply-for-the-green-homes-grant-scheme
[26] https://www.gov.uk/government/collections/green-home-grant-statistics

easy to treat, due to the lack of more detailed information. For loft insulation, the breakdown of loft, flat roof, pitched roof and room-in-roof insulation measures are recorded and included. Further information on the scheme is available in the official statistics[27].

- **Social Housing Decarbonisation Fund (SHDF):** the SHDF scheme is a government scheme that will upgrade a significant amount of the social housing stock currently below Energy Performance Certificate (EPC) C up to that standard. It supports the installation of energy performance measures in social homes in England. The Government launched Wave 1 of the SHDF in August 2021. It has awarded around £179m of grant funding for delivery from 2022 into 2023 and will see energy performance improvements to up to 20,000 social housing properties. For cavity and solid wall insulation, all measures are assumed to be easy to treat, due to the lack of more detailed information. For loft insulation, the breakdown of loft, flat roof, pitched roof, bay roof and room-in-roof insulation measures are recorded and included. Further information on the scheme is available in the official statistics[28].

- **Great British Insulation Scheme (GBIS):** GBIS was announced at the end of March 2023. The £1 billion scheme aims to help the least energy efficient households across the country with the cost of installing new home insulation. The scheme is scheduled to run until March 2026. For cavity and solid wall insulation, all measures are assumed to be easy to treat, due to the lack of more detailed information. For loft insulation, the breakdown of loft, flat roof, pitched roof, bay roof and room-in-roof insulation measures are recorded and included. Further information on the scheme is available in the official statistics[29].

New builds

Information on the number of new properties built in Great Britain is taken from MHCLG, Welsh Government and the Scottish Government.[30] 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” 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 MHCLG.[31] 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”

[27] https://www.gov.uk/government/collections/green-home-grant-statistics
[28] https://www.gov.uk/government/collections/social-housing-decarbonisation-fund-statistics
[29] https://www.gov.uk/government/collections/great-british-insulation-scheme
[30] *England: Table 213:* https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building;
Wales: https://statswales.gov.wales/Catalogue/https://statswales.gov.wales/Catalogue/Housing/New-House-Building/newdwellingscompleted-by-period-tenure;
Scotland: completions: https://www2.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/NewBuildSummary
[31] Table 254: https://www.gov.uk/government/statistical-data-sets/live-tables-on-house-building

category for loft insulation, whereas newly built flats that are not on the top floor are added to the “no loft” category.

MHCLG also separately publish estimates of the number of net additional dwellings.[32] These are included in the “uncertainty” category, as it is unknown what insulation features demolitions and conversions had or are built with.[33]

Assumptions made in producing the estimates

Due to data availability, several further assumptions are made to produce the insulation estimates. These are outlined below.

Cavity wall insulation

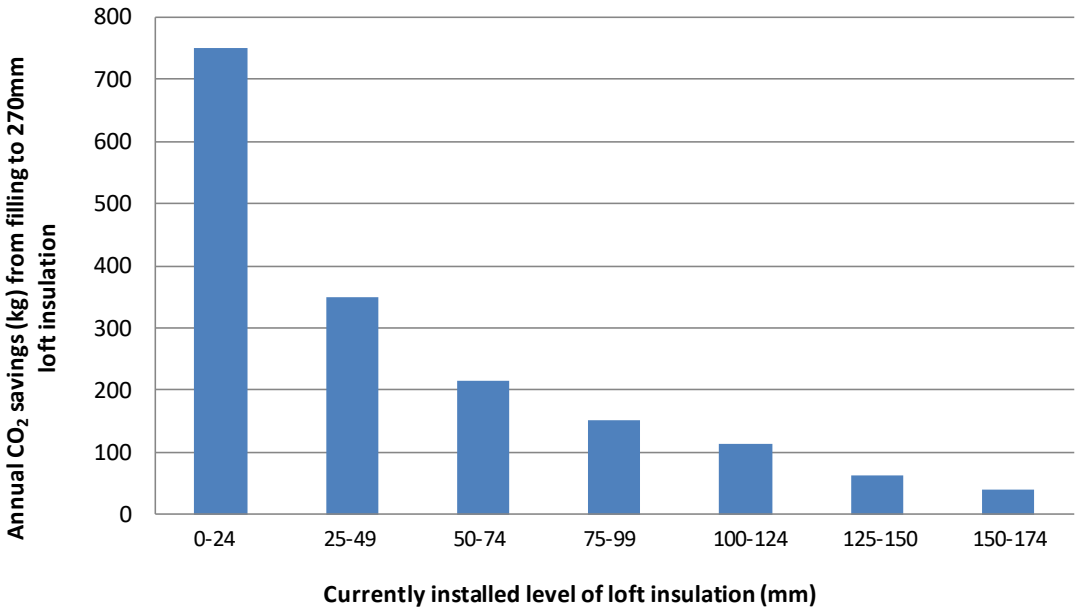
- Cavity wall insulation is becoming increasingly difficult to identify, as over time the injection holes age, fade or are covered up by later work, and contractors are getting better at disguising their work. This may mean that the housing surveys underestimate the number of homes with cavity wall insulation. The Building Research Establishment (BRE) estimate that the EHS underestimate 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 2013 have therefore been adjusted up by five per cent to take account of this. The “uncertainty” category for cavity wall insulation in April 2013 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 define 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 2013 housing surveys a threshold of 125mm is used to describe a property as having loft insulation.

[32] 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.
[33] 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 CO_2 savings from loft insulation for a typical UK house[34]



- 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. Where a loft insulation measure was classified as going into a virgin loft (where there is no existing loft insulation) or a hard-to-treat loft this adjustment has not been applied. Under CERT, a loft with over 160mm of existing loft insulation would not have been eligible for the scheme.

Solid Wall Insulation

- Solid wall insulation can be applied externally or internally.[35] 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 (except for ECO). This means the statistics 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 these figures to the number of remaining homes that could benefit from solid wall insulation.

[34] Based on SAP calculations.
[35] Internal SWI has the advantage of not changing the external appearance of period properties but reduces internal floor area; while external SWI leaves the floor area unchanged but can require external cosmetic work. External SWI finishes, either rendered or cladding can be used to improve the exterior appearance of properties undergoing refurbishment.

Impact of rebasing estimates from 2008 to 2013 housing surveys

As explained in the “2013 baseline” section above, all estimates are now based on the 2013 housing surveys (except for Wales where a property survey carried out by a surveyor has not taken place since April 2008). Rebasing the estimates to a more recent period helps correct for any insulation installations which may have occurred outside of Government Scheme delivery (e.g., DIY, LA funded schemes etc.). The impact of rebasing the estimates includes the following:

- The overall number of solid wall properties (which includes timber, metal, or concrete frames) has increased from 8m from the 2008 housing surveys to 8.5m in the 2013 housing surveys (a 6% increase). Consequently, the number of properties without solid wall insulation has also increased by around 300,000. As with the previous methodology, it is continued to be assumed that the estimate for number of solid wall properties remains unchanged from this new baseline number. This is because data on new builds by wall construction type are not available.

- The overall number of cavity wall properties has decreased by around 0.5m from previously reported estimates based on the 2008 housing surveys, compared to estimates based on the 2013 housing surveys. The 2013 housing surveys also report around 26% of the cavity wall properties remaining potential were hard to treat cavity wall properties (a decrease from around 69% hard to treat from previously reported estimates).

- The overall number of properties with loft insulation has decreased by around 1.4m from previously reported estimates based on the 2008 housing surveys, compared to estimates based on the 2013 housing surveys. This suggests that a larger proportion (more than the assumed 10%) of loft top-ups delivered through Government Schemes between 2008 and 2013 were in properties that already had adequate (125mm or more) loft insulation.

Changes to methodology, September 2016

Estimates were published in September which contain several changes to the previous methodology. These changes include:

- The solid wall insulation baseline insulated category is now formed by taking the number of solid wall properties with solid wall insulation as recorded in each of the housing surveys. Previously, it used information from Government schemes only (as these met Government standards). This difference was categorised as “uncertainty” in the earlier statistics. It means that 126,000 solid wall properties with insulation are now included in the “insulated” category, where the 2013 housing surveys have reported these to have solid wall insulation. This is a more useful and easier to interpret figure, which is consistent with other Accredited Official Statistics published by other Government departments. It should be noted that some older installations may not have reached modern standards of thermal performance (i.e., cladding) and may therefore not be performing as well as more recent installations under Government schemes. The installations of solid wall insulation under Government schemes use materials such as expanded polystyrene, mineral wool, or phenolic board, but these may not have been used in earlier installations of solid wall insulation.

- The number of properties with hard-to-treat cavity walls is now taken from the English Housing Survey and Scottish House Conditions Survey. For Wales, the number of hard-to-treat cavities are based on numbers for England, since this information is not available for Wales.

- Hard to treat lofts are now based on a publication by the Energy Saving Trust (EST) on quantification of non-standard cavity walls and lofts in Great Britain. This has resulted in an increase of around 650,000 hard to treat lofts from previously reported estimates. The EST research defines hard to treat lofts as those which cannot be most straightforwardly or effectively insulated – making them less cost effective to treat. The three issues they identify which might prevent a property from receiving "standard" loft insulation are: roof and loft construction, remedial and access issues; and external features including roof covering.

- Hard to treat properties in the EHS are defined[36] as cavity walls that could in theory be filled, but which exhibit one or more of the following difficulties:
    - They are in a building with three or more storeys, where each storey has cavity walls. The limitation of some insulation systems and the need for scaffolding to install insulation in these higher buildings would contribute to the complication and cost of improving these homes.
    - The gap found in the cavity wall is found to be narrower than in standard walls. Although an attempt could be made to insulate these homes by injecting foam, the limited cavity space may lead to an uneven spread of the insulating material, resulting in substandard thermal properties.
    - The dwelling is of predominantly prefabricated concrete, metal, or timber frame construction. Although more recent homes of these types will have had insulation applied during construction, the walls are generally unsuitable for retrospective treatment. In the case of timber frame construction, the industry recommendation is not to inject insulation as this can hamper ventilation between the frame and the external wall that may lead to rot in the timber frame.
    - The cavity wall has an outer leaf finished predominantly with tiles or cladding which can act as a barrier to the successful injection of insulating material.
- Hard to treat properties in the SHCS are defined[37] as hard to treat if:
    - The building has three or more storeys. Dwellings spaces in lofts are not counted as storeys.
    - The building is severely exposed to wind-driven rain. The SHCS is not able to collect this information, which will lead to an underestimation of hard-to-treat cavity walls.

[36] Source: English Housing Survey 2013, energy efficiency of English housing report, Chapter 3, Hard to treat and energy inefficient properties (page 58)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445445/Chapter_3_Hard_to_treat_and_energy_inefficient_properties.pdf
[37] Source: Scottish House Conditions Survey, 2013, Key Findings (page 100)
http://www.gov.scot/Resource/0046/00465627.pdf

  - Walls at risk of water penetration (i.e., walls requiring urgent repair to the wall finish and walls with penetrating damp).
  - Non-traditional building types (e.g., timber frame, metal-frame, prefabricated concrete).
  - Partially filled, narrow or uneven cavities as well as cavities with failed cavity wall insulation. The SHCS is not able to capture this information. As a result, hard to treat cavity walls may be underestimated.
  - Note that the presence of a conservatory alone does not cause a dwelling to be considered hard to treat under ECO.

- Previously, the cavity wall properties included an “insulated or equivalent” category and “limited potential” category (2.9m and 1.4m respectively, as of March 2013, based on 2008 housing surveys). These categories are no longer included. The “insulated or equivalent category” was made up of properties built post 1995 (England and Wales) and post 1991 (Scotland) and new build properties built since April 2008. These properties are now recorded according to how they are categorised in the housing surveys, rather than using their age of construction. This means that all properties, regardless of their age, that are reported as not having cavity wall insulation in the housing surveys, are reported in these estimates as “remaining potential” (not insulated cavity wall properties). This results in an additional 875,000 uninsulated cavity wall properties. The assumption that these cavity wall properties were insulated (to meet Building Regulations) has changed due to new evidence emerging from the National House Building Council (NHBC) in research by EST on the quantification of non-standard cavity walls and lofts in Great Britain. This evidence shows that there were properties built in these age cohorts, that were not meeting building regulations regarding the level of cavity wall insulation required, and so should not be treated as “insulated or equivalent”. New build properties built since April 2013 are now included in the “insulated” category. The “limited potential” category was made up of properties built between 1983 and 1995 (England and Wales) and 1984 and 1991 (Scotland) – where they were recorded as uninsulated on the housing surveys. These properties are now recorded as remaining potential due to evidence which suggests insulating these properties will produce similar results to insulating properties in earlier age cohorts.

- Previously, the cavity wall properties included an “uncertainty” category which was five per cent of properties recorded as insulated on the housing surveys (pre 1996 in England and Wales, pre 1992 in Scotland). The “uncertainty” category is still present for cavity wall properties (due to a recommendation by BRE that around 5-10 per cent of under reporting for this category) but is made up of five per cent of insulated properties outside of the 1986 to 1995 property age band. For years 1986 to 1995 we have assumed there is no uncertainty and used data from the National House Building Council (NHBC), which hold

data on insulation of homes registered since 1986.[38] NHBC data is comprehensive between 1986 and 1995 and was not available prior to 1986.

Reporting methodology

Missing values are excluded from all calculations of percentages. Underlying percentage figures are rounded to one decimal place or to the nearest whole integer (e.g., all trailing decimals are removed). Some percentages may not add up to the totals due to rounding.

Revision's policy

On occasions, previously published data will need to be revised due to changes to source data or correcting of errors. These will be made at the time of the next release. Some data will be provisional and subject to future revisions.[39] Where a large revision has taken place reasons will be provided.

Monthly information on measures installed (i.e., through ECO and Green Deal Plans) will need to be reviewed to ensure that measures are not reported against more than one funding mechanism. DESNZ will review these figures and other estimates quarterly when we have linked data from different sources to perform further quality assurance on the data.

Further information and feedback

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

EnergyEfficiency.Stats@energysecurity.gov.uk

Contact telephone: 07860 511211 / 07741 701212

Further information on the range of the department's statistics is available at DESNZ Statistics (opens in new window).

[38] Data from 1986 to 1995 is considered to be most comprehensive. Therefore, data held by NHBC from 1996 onwards has not been used in these calculations. This is due to a large proportion of missing NHBC data for these years, which renders these data unreliable.

[39] All measures installed under ECO are provisional until the end of the respective obligation period as checks are undertaken, and measures approved, by Ofgem.

This publication is available from: https://www.gov.uk/government/collections/household-energy-efficiency-national-statistics

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