

Title: GB Insulation Scheme (formerly ECO+) Final IA IA number: DESNZ006(F)-23-NZBI RPC reference number: RPC-BEIS-5266(1). Lead department or agency: Department for Energy Security and Net Zero Other departments or agencies: None	Impact Assessment (IA)			
	Date: 17 May 2023			
	Stage: Final			
	Type of measure: Secondary legislation			
	Contact for enquiries: gbinsulation@beis.gov.uk			
Summary: Intervention and Options				RPC Opinion: GREEN

Total Net Present Social Value (2022 prices, 2023 PV base year)	Business outcomes (2019 prices, 2020 PV base year)		
	Business Net Present Value	Net cost to business per year	Business Impact Target Status
£831m	-£353m	£266m	Qualifying Provision

What is the problem under consideration? Why is government intervention necessary?

The existing levels of government support for energy efficiency were set when energy prices were less than half their current level. Given the increase in energy prices and the Government's statutory fuel poverty and net zero targets there is reason to provide further energy efficiency measures for households on the lowest income as well as households who previously received no support at all. Several market barriers and failures exist in the energy efficiency market, preventing the deployment of energy efficiency in the absence of government intervention. Without intervention, many households will struggle to pay their bills not just this winter but over the coming years.

What are the policy objectives and the intended effects?

The primary objective of the scheme is to provide rapid installation of energy efficiency measures to a wider pool of households, including those on the lowest income and those in the least energy efficient homes in the lower council tax bands, reducing energy bills and tackling fuel poverty in the face of significant energy price rises. The intended effects are to: reduce energy demand in the residential sector (contributing to the national ambition of a 15% reduction in energy consumption by 2030), lower energy bills, make progress against the Government's statutory fuel poverty and climate change commitments, improve energy security and support jobs and growth.

What policy options have been considered, including any alternatives to regulation?

This IA provides analysis of the final policy design for the Great British Insulation Scheme (GB Insulation Scheme). The GB Insulation Scheme (previously consulted on as ECO+) is an additional £1bn obligation on energy suppliers to improve the energy efficiency of EPC D-G properties across two eligibility groups – a 'low-income group' and a 'general group' – between spring 2023 and March 2026. The low-income group consists of households on means-tested benefits, those in social housing and Local Authority or Supplier Flex referrals. The general group consists of homes in Council Tax bands A-D in England and A-E in Scotland and Wales. The overall Scheme target for obligated energy suppliers is £55,998,000 in notional annual bill savings, split into the following annual targets:

- 2023/24: £7,280,000
- 2024/25: £24,359,000
- 2025/26: £24,359,000

Obligated energy suppliers will additionally have to meet at least 20% of their overall and annual targets by installing measures in homes from the low-income group.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 2026					
Is this measure likely to impact on international trade and investment?		No			
Are any of these organisations in scope?		Micro No	Small No	Medium Yes	Large Yes
What is the CO ₂ equivalent change in greenhouse gas emissions over Carbon Budget 5?		Traded: -0.03 MtCO ₂ e		Non-traded: -0.63 MtCO ₂ e	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the final policy position.

Signed by the responsible minister:



Date: 17/05/23

Summary: Analysis & Evidence

GB Insulation Scheme Final Government Position

Description: A £1bn energy company obligation to improve EPC D-G properties across two eligibility groups: a 'low-income group' (households on means-tested benefits, those in social housing and Local Authority or Supplier Flex referrals) and a 'general group' (homes in Council Tax bands A-D in England and A-E in Scotland and Wales). The GB Insulation Scheme targets are set based on £200m of spend on the low-income group and £880m of spend on either the low-income or general group (including £80m of household contributions).

FULL ECONOMIC ASSESSMENT

Price Base Year 2022	PV Base Year 2023	Time Period Years: 44	Net Benefit (Present Value (PV)) (£m)
			Best Estimate: 831

COSTS (£m)	Total Transition (Constant Price)	Average Annual (excl. transition) (Constant Price)	Total Cost (Present Value)
Best Estimate	994	N/A	930

Description and scale of key monetised costs by 'main affected groups' (figures in present value)

Energy suppliers pay towards measure installation costs, including both capex (£463m) and PAS retrofit delivery costs (£271m). Energy suppliers also pay/incur search costs (£91m), administration costs (£61m) and pay the 'economic rent' that arises in the marketplace for notional annual bill savings (£70m). Energy suppliers' costs are accounted for in the default energy tariff price cap set by Ofgem, with the Government partially/fully covering the resultant increase in consumer energy costs through the Energy Price Guarantee (EPG) in 2023/24. Household contributions towards measures total £77m, though overall households make a saving of £11m on measures as some households are assumed to pay the full cost of measures in the counterfactual. Additional hassle costs incurred by households total £34m. Households pay £13m re-installing measures at the end of their lives.

Other key non-monetised costs by 'main affected groups'

Key costs have been monetised.

BENEFITS (£m)	Total Transition (Constant Price)	Average Annual (excl. transition) (Constant Price)	Total Benefit (Present Value)
Best Estimate	3,552	N/A	1,761

Description and scale of key monetised benefits by 'main affected groups' (figures in present value)

Societal benefits from a reduction in GHG emissions account for 56% of the total benefit (£978m), whilst improved air quality accounts for a further 2% (£38m). Total fuel bill savings for households living in improved homes are estimated to be £1,065m over the 44-year appraisal period (of which £557m are societal benefits relating to avoided energy supply costs). In addition, £188m of comfort benefits are expected for households receiving measures. Installers of measures are assumed to acquire £70m of 'economic rent' (a transfer).

Other key non-monetised benefits by 'main affected groups'

Non-monetised benefits include improved security of energy supply, lower energy imports and the health benefits gained by households receiving measures who will live in warmer homes.

Key assumptions/sensitivities/risks

Discount rate: 3.5% (≤ 30 years), 3% (> 30 years)

Key assumptions:

- It is assumed that properties are treated in descending order of cost-effectiveness.
- Each year, 20% of the total/remaining pool of treatable homes are identified and considered for upgrade.
- Households in the general group will collectively contribute £80m towards measures.
- 20% of households in the general group would have installed measures at some point anyway.

Key risks:

- Measure costs are higher than expected and/or there are supply chain issues.
- The available technical and cost-effective potential for measure installations is lower than modelled.

BUSINESS ASSESSMENT (2019 prices, 2020 present value)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 266	Benefits: 0	Net: 266	799

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1. Problem under consideration and rationale for government intervention

1. This final stage Impact Assessment (IA) provides analysis of the final policy design for the Great British Insulation Scheme (GB Insulation Scheme).¹ The GB Insulation Scheme (previously ECO+) is an additional obligation on energy suppliers to meet targets of notional annual bill savings (ABS) by installing qualifying energy efficiency measures into homes in Great Britain. These measures help households to keep their homes warmer, reduce their energy bills and carbon emissions. The GB Insulation Scheme will run from spring 2023 to March 2026 alongside the existing Energy Company Obligation (ECO4) scheme.

2. Upgrading the energy efficiency of homes addresses several Government objectives by:

- **Reducing energy demand to help secure the UK's energy independence.** In the Autumn Statement 2022, the Government set out the ambition to reduce the UK's final energy consumption by 15% from 2021 levels by 2030. Given that the residential sector accounted for around 31% of UK final energy consumption in 2021², improving the energy efficiency of homes in the UK can make a significant contribution to achieving the 2030 ambition.

Action now will build on what has already been achieved through the more efficient use of energy in the UK. The International Energy Agency estimates that since 1990 energy efficiency improvements have reduced the UK's energy imports by around 25 million tonnes of oil equivalent, and reduced the UK's import bill by around \$7 billion.³

- **Lowering energy bills.** Given the current cost of living crisis and associated high energy prices, more households today are struggling to afford to heat their homes. Since 1 April 2023, the default energy tariff price cap set by Ofgem is £3,280 for a dual fuel household paying by direct debit, based on typical consumption. This is 157% higher than the £1,277 price cap that was in place over winter 2021/2022. The Government is protecting consumers from these high energy prices through the Energy Price Guarantee (EPG), which for a typical household will bring energy bills down to around £2,500 per year until the end of June 2023. Between July 2023 and March 2024, the EPG will be set at £3,000. Whilst the EPG has reduced energy bills for millions of households, complementary support to reduce households' energy consumption is required to make heating homes in Britain more affordable.

Such support is not only needed for those towards the bottom of the income distribution. To protect the most vulnerable, over 2023/24 the Government will be providing an additional Cost of Living Payment of £900 to households on means-tested benefits, of £150 or £300 (depending on circumstances) to pensioner households, and of £150 to individuals on disability benefits. The government has also raised benefits, including working age benefits and the State Pension, by 10.1% for 2023/24 in line with inflation. Middle-income households are not being supported to the same extent, though they too will face difficulties in covering their living costs, including energy bills. Research carried out by the Social Market Foundation and

¹ The Government's response following its consultation on the GB Insulation Scheme (previously titled and consulted on as Energy Company Obligation Plus (ECO+)) summarises the responses received and related government decisions in implementing the scheme. It is available here: <https://www.gov.uk/government/consultations/design-of-the-energy-company-obligation-eco-2023-2026>.

² BEIS Energy Consumption in the UK, 2021: <https://www.gov.uk/government/statistics/energy-consumption-in-the-uk-2021>. See Table C1.

³ International Energy Agency Energy Efficiency Report (2015):

<http://www.iea.org/publications/freepublications/publication/MediumTermEnergyefficiencyMarketReport2015.pdf>

Public First has suggested there are up to three million households who could struggle with their energy costs, who do not receive benefits or pensions and will therefore miss out on extra support.⁴ It is appropriate for the government to extend the coverage of its energy efficiency schemes to cover these households in the 'squeezed-middle'.

- **Tackling the root cause of fuel poverty** and making progress towards the Government's statutory fuel poverty target for England (to ensure that as many fuel poor homes as is reasonably practicable achieve a minimum energy efficiency rating of band C, by 2030).
- **Reducing greenhouse gas emissions in the domestic sector**, contributing to the Government's legally binding carbon reduction targets. The residential sector is responsible for around 16% of the UK's net greenhouse gas emissions.⁵
- **Improving health outcomes, leading to savings for the NHS** - living at low temperatures poses a risk to health, with a range of negative morbidity and mortality impacts associated with exposure to the cold. The Marmot Review on cold homes and health⁶, in addition to the Hills Fuel Poverty Review⁷, set out the strong body of evidence linking low temperatures to these poor health outcomes.

3. Market failures and barriers exist in the domestic energy efficiency market, slowing and preventing take-up of socially cost-effective energy efficiency measures. Key market failures and barriers that would be addressed by the GB Insulation Scheme are:

- **Access to capital** - the upfront cost of energy efficiency measures means households must choose between investing in them or using the same money for other purposes (the 'opportunity cost'). Whilst this lack of access to capital will be particularly acute for the lowest income, vulnerable and fuel poor households who are the target of existing government schemes including ECO4, Green Homes Grant Local Authority Delivery, the Home Upgrade Grant and the Social Housing Decarbonisation Fund, many more households today will not be able to afford energy efficiency measures. The OBR forecasts that average living standards in the UK – as measured by after-tax real incomes per person – will be 6% lower in 2023/24 than in 2021/22.⁸
- **Incomplete or asymmetric information** - households may have limited knowledge on how best to improve their property and lack of awareness on where trusted installers of measures can be found. As such, consumers may not feel confident in assessing the risk of buying a poor-quality service and may prefer to withdraw from the market or heavily discount the claimed savings from energy efficiency measures. Under the GB Insulation Scheme, measure installers and energy suppliers identify homes which can be improved and, for the most part, are incentivised to treat those which generate the greatest energy bill savings per pound invested in measures. Installers treating homes under the GB Insulation Scheme must follow industry standards to make sure the most suitable measures are selected and are installed correctly. By making use of established ECO supply chains, the GB Insulation Scheme

⁴ <https://www.smf.co.uk/the-missing-middle-7-2-million-face-energy-bills-crisis-without-help/>

⁵ BEIS Final UK greenhouse gas emissions national statistics, 2023: <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2021>. See Table 1.2.

⁶ Marmot Review Team (2020). *Health equity in England: The marmot Review 10 years on*. Available at: <https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on>

⁷ Hills (2012). *Getting the measure of fuel poverty*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48297/4662-getting-measure-fuel-pov-final-hills-rpt.pdf

⁸ <https://obr.uk/efo/economic-and-fiscal-outlook-march-2023/>

reduces the burden on households to research how best to improve their home or find reputable installers.

- **Externalities** - By subsidising the cost of energy efficiency measures, the government will also help internalise into household decision making the external benefits associated with reducing energy consumption, including reducing greenhouse gas emissions and improving UK energy security (reducing energy consumption lowers the risk that UK energy demand will exceed UK energy supply).

2. Policy objectives

4. Various schemes could be developed and implemented, or expanded, by the government to support households to upgrade the energy efficiency of their homes. The GB Insulation Scheme (a new Energy Company Obligation (ECO) energy efficiency scheme) was established as the preferred way forward to meet the leading aim of delivering cost-effective energy efficiency measures at pace and in high volumes from spring 2023.
5. ECO has existed since 2013 and has a proven track record of success in delivering measures. Between January 2013 and December 2022, 3.5 million measures were installed under ECO in around 2.4 million properties (this means that close to 1 in 10 households in Great Britain have benefitted from ECO to date).⁹ In the most recent iteration of the scheme to have completed, ECO3 (October 2018 – March 2022), energy suppliers successfully met their overall obligation within the scheme's spending envelope – to March 2022, energy suppliers' total delivery and administration costs from ECO3 were £1.95bn¹⁰, which compared to a £2.24bn spending envelope for the scheme.
6. The ECO model encourages efficient delivery of energy efficiency measures as energy suppliers have an incentive to meet their obligations as cost-effectively as possible. In addition, every iteration of ECO builds on previous versions of the scheme, making use of established supply chains and learning amongst suppliers.
7. If the government were to pursue an alternative public vouchers or rebate scheme along the lines of the Green Homes Grant (GHG) Voucher Scheme or Boiler Upgrade Scheme, it would be very unlikely to support households this winter – the 2020/21 GHG Vouchers scheme underperformed due in part to its rushed delivery and implementation, highlighting the risk of trying to establish a new scheme quickly.
8. For the GB Insulation Scheme, the following objectives have been set based on the modelled, expected outcomes for the scheme:¹¹
 - 1) **Over 300,000 households supported with energy efficiency measures** between 2023 and 2026.

⁹ See Tables 1.1 and 1.2 of the Household Energy Efficiency Statistics (March 2023):

<https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-march-2023>

¹⁰ See Table 6.6 of the Household Energy Efficiency Statistics (March 2023): <https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-march-2023>

¹¹ The accuracy of key modelling assumptions will be considered as part of the monitoring and evaluation of the GB Insulation Scheme. A successful scheme in terms of delivering measures to households may fail to achieve one of the set objectives if an inaccurate assumption is used, e.g., if the assumed level of energy savings from installing a measure is inaccurate.

- 2) Households supported through the scheme have energy bills lower than they otherwise would have been, with an **average bill saving of £300-400 per year**, based on Department for Energy Security and Net Zero (DESNZ) retail energy price forecasts for 2023.¹²
- 3) **Over 100,000 homes upgraded to at least an energy efficiency rating of Band C**, helping the government meet its statutory fuel poverty target.
- 4) **Carbon savings of 0.13 MtCO₂e per year** delivered from 2026 onwards (equating to 0.65 MtCO₂e savings for Carbon Budget 5 (2028 – 2032)).

See Section 9 for a broad plan of how the policy will be monitored and achievement of these objectives assessed. In addition to these specific objectives, the GB Insulation Scheme is also intended to lead to supply-side growth in the markets for energy efficiency measures, with more jobs and better local capability to service demand.

3. Policy options

9. For the GB Insulation Scheme, the Government consulted on different policy design choices, including:
 - The setting of mandatory annual targets for notional annual bill savings (ABS) and carry-under / carry-over flexibilities on these.
 - Household eligibility, including the definitions of a ‘low-income group’ and ‘general group’ that can receive measures and the treatment of different tenures. A proposal that a minimum share of ABS delivered must come from low-income households was also consulted on, as was a proposal to allow significant use of ECO Flexible Eligibility¹³ to meet the low-income minimum requirement and unconstrained use outside of that.
 - Eligible measures and whether to have minimum energy performance improvement requirements.
 - Whether the modelled ABS targets should account for household contributions towards measures and the appropriate level for these.
 - The retrofit standards to use to ensure households get the best measures for their home and that they are installed to a decent, industry standard.
 - How to score installations in terms of the ABS they achieve, including uplifts.
10. The Government Response on the GB Insulation Scheme consultation sets out the Government’s final position on how the scheme will work. The final policy decisions were made with regard to the overall objectives of the Government (see Section 1); the strategic aim for the scheme to deliver cost-effective energy efficiency measures at pace and in high volumes; stakeholder responses to the consultation; and evidence from the analysis of alternative policy designs. With respect to the analysis, the GB Insulation Scheme

¹² The relevant DESNZ retail energy price forecasts are those from the January 2023 update to the Green Book supplementary guidance on valuing energy use and greenhouse gas emissions: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>. The range produced for the average energy bill saving comes from using scenarios A and C for gas prices, with central price predictions used for other fuels.

¹³ Under Local Authority and Supplier Flex, a local authority or participating supplier can refer private tenure households that it considers to be living in fuel poverty or on a low income and vulnerable to the effects of living in a cold home.

Consultation Stage IA assessed three options based on the minimum share of support (based on ABS delivered) to guarantee for households in the scheme's low-income group: 0%, 20% or 100%.¹⁴ The 20% low-income minimum requirement option was concluded as the preferred option. The option had both a high and competitive NPV and equity-weighted NPV, the modelling suggested it would lead to the greatest number of homes being treated and the option was ranked second only marginally in terms of carbon savings delivered. By offering support to a broader range of households compared to existing energy efficiency schemes, the option would help to fill a gap in DESNZ's portfolio of energy efficiency policies, whilst also guaranteeing further support for low-income households.

11. This IA sets out the estimated outcomes and impacts of the Government's final position on the GB Insulation Scheme. The assessed options are as follows:

Option 0 – The GB Insulation Scheme is not implemented (do nothing)

12. Under this option, energy suppliers will not be required to go further than fulfil their existing obligations under the ECO4 scheme. Those households who would benefit from the GB Insulation Scheme would not be financially supported to install energy efficiency measures and therefore a low volume of installations would be expected - it is assumed that no low-income households would install measures without the scheme, whilst 20% of households that would be supported as part of the 'general group' (that are also not low-income) would install measures in the counterfactual (this assumption is deliberately optimistic to avoid overstating the additional impacts of the GB Insulation Scheme).¹⁵ There would be no cost to energy suppliers from this option.

Option 1 – Final Government position on the GB Insulation Scheme

13. The final Government position is to implement the GB Insulation Scheme as a new £1bn ECO scheme that obligates energy suppliers to improve the energy efficiency of EPC D-G properties across two eligibility groups – a 'low-income group' and a 'general group' – between spring 2023 and March 2026. The low-income group consists of households on means-tested benefits, those in social housing and Local Authority or Supplier Flex referrals. The general group consists of homes in Council Tax bands A-D in England (81% of homes in England are in one of these bands) and A-E in Scotland and Wales (86% and 87% of homes in Scotland and Wales are in one of these bands, respectively).¹⁶

14. For each qualifying energy efficiency measure installed, energy suppliers will earn ABS¹⁷ in accordance with the partial project ABS scores used for ECO4.¹⁸ This is excluding the 20%

¹⁴ The GB Insulation Scheme (then ECO+) Consultation Stage IA is available here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1124893/ECO+_consultation_stage_impact_assessment.pdf

¹⁵ The assumption that 20% of households in the general group would install measures at some point without the GB Insulation Scheme is based on survey work conducted with households who installed measures under the Green Homes Grant Vouchers Scheme. Amongst the households who had cavity wall insulation installed under that scheme, 29% said they were likely to have installed the measure anyway. There are reasons to believe that a significantly lower proportion of households in the GB Insulation Scheme general group would install measures in the absence of support. Statements made in surveys on the likelihood of acting are weakly correlated with actual action and there is no evidence of such significant take up of measures outside of government schemes.

¹⁶ Figures for England and Wales have been derived from Government official statistics on properties by Council Tax Band, available at: <https://www.gov.uk/government/statistics/council-tax-stock-of-properties-2022>. The figure for Scotland comes from Scottish Government statistics on the number of chargeable dwellings by Council Tax Band for September 2022, available at: <https://www.gov.scot/publications/council-tax-datasets/>.

¹⁷ Notional annual bill savings (ABS) are bill savings calculated based on SAP 2012 fuel prices. They do not reflect what households receiving measures could save on their energy bills today, using the latest fuel prices.

¹⁸ The ECO4 partial project scores for qualifying measures are available at: <https://www.ofgem.gov.uk/publications/eco4-scoring-methodology>

deflator used in ECO4, which is used in that scheme to encourage energy suppliers to complete a full ECO4 retrofit project, which would then be awarded a full project score. Using the ECO4 partial project scores means that the amount of ABS awarded under the GB Insulation Scheme depends on the type of measure installed, the floor area of the property and its starting EPC band. For heating controls, the main heating system in a property (e.g., gas boiler, oil boiler, heat pump, etc.) will also affect the amount of ABS awarded.

15. The ABS scoring framework has been primarily designed to incentivise delivery of those measures that bring about the greatest reduction in energy bills, in line with the objectives of ECO4 and the GB Insulation Scheme. To also incentivise innovation in how properties are insulated and in the markets for heating controls, energy suppliers are awarded ‘uplifted’ scores when innovative measures are delivered to low-income households under the GB Insulation Scheme (either a 25% or 45% uplift is available)¹⁹. Energy suppliers are also awarded uplifted scores (+20% for each measure installed) when they provide measures to low-income households in rural, off-gas homes in Scotland and Wales. This uplift is designed to offset the higher cost of delivering measures to these households.
16. The overall ABS target under the GB Insulation Scheme for obligated energy suppliers is £55,998,000, to be achieved by March 2026. This splits into the following mandatory annual targets:
 - April 2023 – March 2024: £7,280,000
 - April 2024 – March 2025: £24,359,000
 - April 2025 – March 2026: £24,359,000
17. Energy suppliers will need to meet at least 20% of their annual ABS targets by treating homes in the low-income group.
18. The final, overall ABS target of £55,998,000 is only slightly lower than the overall target that was estimated for the preferred policy option at the time of scheme consultation (£57,120,000). Compared to the modelling undertaken in the consultation stage IA for the scheme, the final modelling has incorporated higher measure cost assumptions. These updated cost assumptions have been the primary factor causing the estimated number of homes treated through the scheme to fall by just under 100,000 (24% of the consultation stage estimate). The reason the overall ABS target has not fallen in proportion to the fall in estimated homes treated is mainly because of a correction applied to the ABS scores modelled for EPC E/F/G properties. At the time of consultation, the model was using ABS scores for EPC E/F/G properties that were too low.
19. Ofgem will set individual supplier ABS targets each year based on market share, using the same approach and data points as for ECO4. The estimated overall market share of obligated suppliers is 99.76% as of 31 December 2021, based on their share of domestic customers.²⁰
20. The overall and annual ABS targets are set on the basis of Department for Energy Security and Net Zero (DESNZ) modelling of energy efficiency measures installations under the GB

¹⁹ A 25% uplift is awarded where a reasonable explanation is provided of how the innovation measure is an improvement against its standard counterparts which are commonly available on the market, and a 45% uplift is given for measures that demonstrate a substantial improvement across a range of criteria (including, but not limited to, expected bill savings, supplier cost savings, environmental impact, or other benefits).

²⁰ Source: Ofgem

Insulation Scheme (see Section 4.1). £200m of spend on homes in the low-income group was modelled, with £880m of spend modelled to go to either homes in the low-income group or general group, depending on how cost-effective they are to treat.²¹ The £880m spend amount includes £80m of assumed household contributions through the general group.

21. Table 1 summarises what households are eligible to receive under the GB Insulation Scheme based on which group they belong to and their housing tenure. All households are eligible for a single insulation measure, with secondary heating controls also available for low-income owner-occupiers only.

Table 1: Household eligibility (see Table 2 for qualifying measures)

Households in the low-income group	Households in the general group
<ul style="list-style-type: none"> • Must be either receiving means-tested benefits, living in the least efficient social housing or referred through the Local Authority or Supplier Flex mechanisms as being low-income, fuel poor and/or vulnerable, and then for: • Owner-occupiers: If the household owns the home and the home is EPC D or below, then the household can receive any qualifying insulation measure, plus heating controls. • Private renters: If the household lives in an EPC D or E home, then the household can receive any qualifying insulation measure.²² • Social renters: If the household lives in EPC E or below social housing, then the household can receive any qualifying insulation measure. If the home is EPC D, then only a qualifying innovation measure is allowed. 	<ul style="list-style-type: none"> • Must be living in a Council Tax band A-D home in England or A-E in Scotland and Wales, and then for: • Owner-occupiers: If the household owns the home and the home is EPC D or below, then the household can receive any qualifying insulation measure. • Private renters: If the household lives in an EPC D or E home, then the household can receive any qualifying insulation measure other than cavity wall insulation and loft insulation.²¹ • Social renters: All social renters are included in the low-income group (see eligibility rules opposite).

22. In Great Britain, 9.0 million households are estimated to fall into the low-income group, of which 4.0 million are estimated to be eligible through Local Authority or Supplier Flex²³. Around 12.3 million households are estimated to fall into the general group. Of this 12.3 million, 7.9 million also belong to the low-income group²⁴, whilst the other 4.3 million are exclusive to the general group – see Figure for a diagrammatic illustration of how the low-income and general groups overlap.

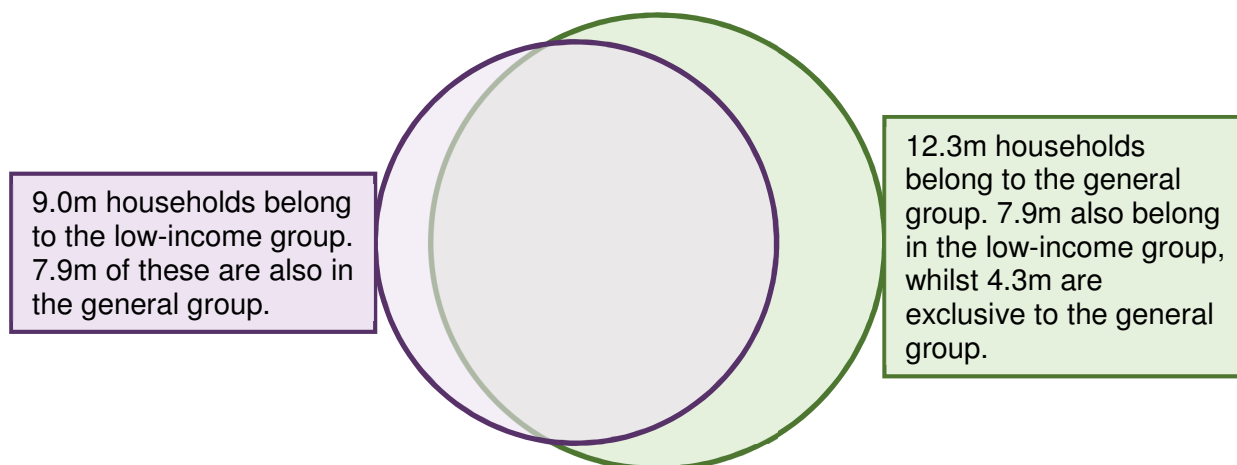
²¹ Whilst it only accounts for 18.5% of total modelled spend, the £200m of spend on the low-income group accounts for around 20% of the overall ABS target. This is because it generates 59 ABS per £1,000 of spend, whereas the £880m of spend on either household group generates only 50 ABS per £1,000 of spend.

²² EPC F and G PRS homes will also be eligible for support if either of the following two conditions apply: (i) if the property has registered a valid exemption in relation to the PRS EPC E Regulations, or (ii) if the property is not in scope of the PRS EPC E Regulations because it is not legally required to have an EPC or it is not let on one of the relevant tenancy types.

²³ As done in ECO4 modelling, the pool of LA/Supplier Flex homes that can be found in the GB Insulation Scheme modelling is reduced by 50% (of 4 million) to proxy for local authority engagement in the scheme.

²⁴ Not all of these 7.9 million low-income households are modelled as belonging to the low-income group in this impact assessment. 50% of those homes that would belong to the low-income group through LA/Supplier Flex are modelled as belonging to the general group only. This means that the true proportion of low-income homes treated when GB Insulation Scheme support is given to the general group could be slightly higher than presented in Table 5 of this IA.

Figure 1: Relationship between the low-income group and general group



23. Table 2 lists the energy efficiency measures that will count towards an energy supplier's ABS targets for the GB Insulation Scheme.

Table 2: Qualifying energy efficiency measures

Scheme energy efficiency measures
<ul style="list-style-type: none"> • Cavity wall insulation • Solid wall insulation (both external and internal) • Loft insulation • Pitched roof insulation • Flat roof insulation • Underfloor insulation • Solid floor insulation • Park home insulation • Room-in-roof insulation • Heating controls (room thermostat, boiler programmer and/or thermostatic radiator valves) – only allowed as a secondary measure for low-income, owner-occupier households • Innovation measures of any of the above measure types, that are approved under ECO4²⁵

24. With respect to the retrofit standards used to ensure households are protected and get the best measure for their property, installed to a decent standard, all GB Insulation Scheme measures will need to be delivered in accordance with PAS (Publicly Available Specification) standards (PAS 2035).

25. The GB Insulation Scheme is accounted for in the default tariff cap²⁶ (the price cap) set by Ofgem. The price cap ensures that default tariff customers pay a fair price for their energy

²⁵ <https://www.ofgem.gov.uk/eco4-innovation-new-measures-and-products>

²⁶ <https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/default-tariff-cap>

that reflects the efficient underlying cost to supply that energy. The cap sets maximum, capped prices that energy suppliers can charge default tariff consumers for each kilowatt hour (kWh) of gas and electricity. Ofgem calculate the cap levels using a bottom-up assessment of the costs of a notionally efficient supplier and the cap is made up of several different allowances which reflect these different costs. One of these allowances covers policy costs, through which energy suppliers are able to recover costs related to their obligations under certain government programmes.

26. In February 2023, Ofgem decided to introduce a cap allowance for the GB Insulation Scheme (then referred to as ECO+), from cap period 10a (April 2023 – June 2023) onwards.²⁷ This decision followed a consultation in January 2023. This allowance reflects the costs associated with the additional obligations the scheme places on energy suppliers. Ofgem calculate the allowance by taking the anticipated annualised cost of the scheme set by Government, adjusting for inflation using a GDP deflator, and dividing by the latest obligated supplier volumes for each fuel type to provide a cost per MWh supplied for electricity and gas.²⁸
27. Ofgem’s February 2023 decision sets out that the allowance value for price cap period 10a is £5 per typical dual fuel customer and is anticipated to remain around £5 for the other cap periods corresponding with year one of the scheme. For cap periods corresponding with years two and year three of the scheme, Ofgem anticipate the allowance value will be approximately £17 per typical dual fuel customer, based on the increased scheme spend profile for those years. Note that these allowance values are annualised for a typical dual fuel customer at benchmark typical domestic consumption values used to set the price cap. The amount that individual customers could end up paying is tied to how much energy they consume - as higher income households consume more energy on average, they are expected to pay more on average.²⁹
28. In 2023/24, the Government will partially/fully cover the resultant increase in consumer energy costs through the Energy Price Guarantee (EPG). The Government’s EPG scheme has introduced another set of caps on what energy suppliers can charge customers for the gas and electricity they consume. When the EPG rates cause energy consumers’ bills to fall below what they otherwise would have been under Ofgem’s price cap, the Government pays energy suppliers the difference. Therefore, how much of the GB Insulation Scheme is paid for by Government in the first year will depend on if and when the Ofgem price cap falls below EPG levels. As the EPG scheme is due to end in March 2024, in years two and three of the GB Insulation Scheme, domestic energy consumers are expected to fully cover energy suppliers’ costs through their bills.

²⁷ <https://www.ofgem.gov.uk/publications/price-cap-decision-planned-eco-scheme>

²⁸ The calculations involved in setting the allowance value for price cap period 10a can be found here: https://www.ofgem.gov.uk/sites/default/files/2023-02/Annex_4_-_Policy_cost_allowance_methodology_v1.14.xlsx

²⁹ The positive relationship between domestic energy consumption and household income can be seen in the National Energy Efficiency Data-Framework (NEED) energy consumption data. See Table A11 (gas consumption by income) and Table A12 (electricity consumption by income) of the NEED additional consumption tables for England and Wales (2019), available at: <https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-consumption-data-tables-2021>

4. Analytical approach

4.1 Modelling measures installations and determining the ABS targets

29. The £1bn (in 2022 prices) GB Insulation Scheme obligation on energy suppliers splits across the three years of the scheme as follows³⁰:

- April 2023 – March 2024: £130m
- April 2024 – March 2025: £435m
- April 2025 – March 2026: £435m

The annual ABS targets listed in Section 3 were set based on modelling of how many ABS could be acquired by energy suppliers given these budgets. An allowance was made for £64m of energy supplier administration costs over the three years, which is in line with the share of energy suppliers' ECO3 spend that went on administration³¹ (statistics are not available for ECO4).

30. The modelling has also incorporated the assumption that installers / energy suppliers will be able to leverage £80m of household contributions from the general group (£10m in year one and £35m in years two and three). This assumption was tested with stakeholders through the GB Insulation Scheme consultation and received mixed views – 41% of respondents who provided a view agreed with the assumption.³² However, only one respondent quoted evidence (polling data) to back up their view and it should be appreciated that stakeholders will have a variety of interests that may have affected their position, e.g., a desire to promote greater numbers of measure installations or the opposite desire to keep the ABS targets relatively low.

31. There is evidence to suggest that the assumption on household contributions is reasonable. Research carried out by Kantar Public UK, on behalf of BEIS (now the Department for Energy Security and Net Zero (DESNZ)), found that peoples' stated choices on whether or not to install an insulation measure were not disproportionately affected by the level of customer contribution required. This research consisted of an online experiment and follow-up survey with 1,000 owner occupiers in Great Britain who would meet the criteria for receiving an insulation measure through the GB Insulation Scheme general eligibility group. Furthermore, recent polling of UK/British homeowners carried out on behalf of BEIS (now DESNZ) and polling carried out by other organisations has indicated growing interest amongst homeowners for energy efficiency measures and a high willingness to contribute. For example, Social Market Foundation analysis of polling data collected in October 2022 suggested that around three-quarters of homeowners would be willing to contribute some money towards insulation, with almost half being willing to contribute £500 or more.³³

³⁰ These annual budgets are increased in line with inflation so that total scheme spend over the three years equates to £1 billion in 2022 prices. The inflation adjustment uses HM Treasury's GDP deflator series (based on Office for Budget Responsibility (OBR) forecasts): <https://www.gov.uk/government/collections/gdp-deflators-at-market-prices-and-money-gdp>

³¹ Household Energy Efficiency Statistics (March 2023), Table 6.6: <https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-march-2023>. The statistics show that administration costs accounted for 5.9% of total costs. This 5.9% rate has been applied to the £1.08bn overall spend under the GB Insulation Scheme, including £80m of household contributions.

³² See Q47 of the GB Insulation Scheme Government Response, available at: <https://www.gov.uk/government/consultations/design-of-the-energy-company-obligation-eco-2023-2026>

³³ <https://www.smf.co.uk/publications/lagging-behind/>

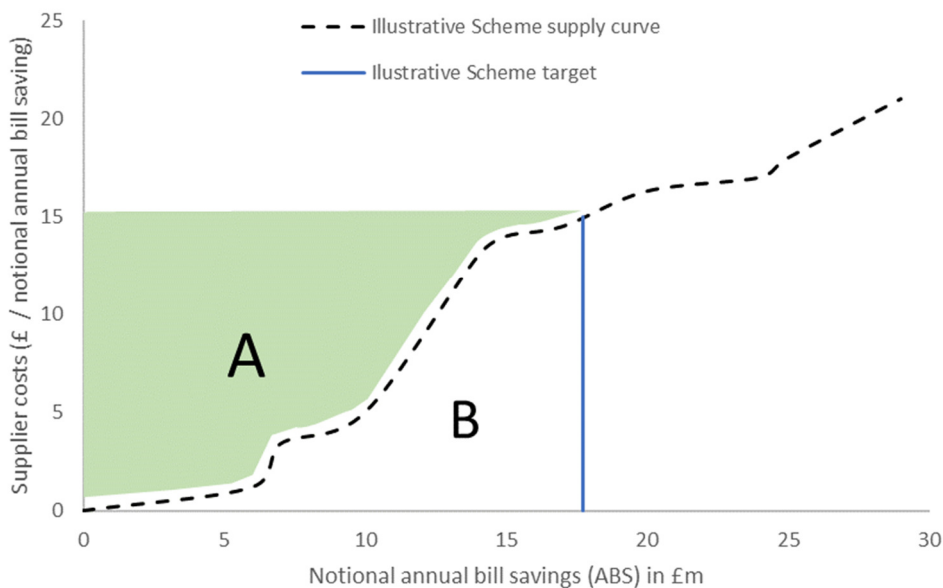
32. As with ECO4, DESNZ's National Household Model (NHM)³⁴, based on updated 2013/14 dwelling stock data from the English Housing Survey (EHS), was used to model installations of energy efficiency measures and determine the annual ABS targets.^{35,36} This was done by selecting eligible properties and installing measures in order of cost-effectiveness (based on £ spent per ABS) until the scheme budget for each year had been reached. To mitigate the risk that this modelling approach could lead to too high an ABS target in year one, the ABS targets have been smoothed across the three years of the scheme as discussed at the end of this section.
33. As observed with previous ECO schemes, under the GB Insulation Scheme, installers of energy efficiency measures and managing agents are expected to sell ABS to energy suppliers. Given the incentive of energy suppliers to acquire ABS at least cost and the incentive of installers to maximise their profits selling ABS, it is reasonable to assume that measures will be installed in order of cost-effectiveness. Setting ABS targets based on this assumption also encourages the behaviour, as the targets may be missed otherwise.
34. The market for ABS between installers as the providers/sellers and energy suppliers as the consumers is assumed, for simplicity, to be perfectly competitive with a single market price (£/ABS). This market price is determined by the cost of the last home treated in terms of cost-effectiveness (the marginal home). Figure 2 illustrates how for a given level of demand amongst energy suppliers for ABS (the blue vertical line) how the marginal home on the supply curve for ABS sets the market price.

³⁴ <https://www.data.gov.uk/dataset/957eadbe-43b6-4d8d-b931-8594cb346ecd/national-household-model>

³⁵ As the NHM is based on homes in England, an 'England-only' scheme equivalent to £857m of spend by energy suppliers was modelled. The results for this England-only scheme were then scaled up to the GB-wide £1bn scheme. The size of the England-only scheme was based on the ratio of households in England to Great Britain (<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland>).

³⁶ The NHM 2013/14 dwelling stock has been updated to account for energy efficiency and heating measures installed since 2013/14, using data from DESNZ's Household Energy Efficiency Statistics (<https://www.gov.uk/government/collections/household-energy-efficiency-national-statistics>) covering ECO and Green Deal, plus modelling of policies, such as the PRS EPC E Regulations. For each year of the GB Insulation Scheme, measures installations due to ECO4 are modelled before measure installations due to the GB Insulation Scheme. This means that the pool of low-income households available to energy suppliers under the GB Insulation Scheme is lower than if ECO4 were not in place.

Figure 2: Illustrative market for ABS



35. The ‘artificial’ market created by the GB Insulation Scheme for ABS enables installers to acquire economic rent - they are paid more for treating properties than their opportunity cost, which is what it actually costs to treat the property or the amount they would be paid to treat the property outside of the GB Insulation Scheme.³⁷ In Figure 2, the total opportunity cost (a social cost) of servicing energy suppliers’ demand for ABS is represented by area B, whilst area A is economic rent assumed to go to installers. The total cost faced by energy suppliers to meet their ABS target is area A + B.

36. In the social cost-benefit analysis of the GB Insulation Scheme (see Section 5), all economic rent is assumed to go to installers based on anecdotal evidence from stakeholders. However, there may be instances where households acquire the economic rent if, for example, an installer or energy supplier gives money / gifts in kind to a household in order to treat their property. Should the actual market clearing prices for ABS be below what DESNZ models, then energy suppliers could acquire some of the economic rent as the allowance made in the Ofgem price cap (setting the maximum energy suppliers can charge customers for energy) is based on what DESNZ models energy suppliers’ costs to be. However, competition in the market for energy customers may mean energy suppliers forgo this economic rent, instead choosing to offer customers lower rates for energy compared to the Ofgem price cap – this competition for energy customers also provides an incentive for energy suppliers to deliver their share of the GB Insulation Scheme at least cost.

37. Based on stakeholder feedback during the ECO4 consultation that most pricing contracts for ABS last around six months, the market for ABS is run every six months in the modelling. There are different market prices in each six-month period due to changes in supply (more homes to treat are found over time and previously treated homes drop out of the market) and changes in demand (the amount to be spent by energy suppliers changes).

38. In addition, there is evidence from previous ECO schemes of multiple markets for different sub-obligations. It is therefore assumed that a separate market for ABS that count towards

³⁷ Note the economic rent acquired by installers from the GB Insulation Scheme is different to the producer surplus they would get in existing markets for energy efficiency measures.

the low-income group minimum requirement (at least 20% of the overall annual targets) will emerge with a separate market price. This is because a single market price may fail to bring into equilibrium both overall demand and supply of ABS, and the subsets of demand and supply that relate to ABS from low-income households. For instance, if there was a single price for ABS, an energy supplier could achieve their overall ABS target, but fall short on their low-income minimum requirement. That supplier would then have an incentive to pay above the single market price to secure ABS from a low-income home.

39. Differences in the costs of finding low-income households and treating their homes, compared to other households in the general group, could also lead to a different market price for ABS associated with the low-income minimum requirement. Whilst not assumed in the modelling, the costs of finding households that satisfy the low-income group requirements could be greater than for the general group. In addition, installers are expected to be able to secure contributions from households in the general group, which could lower the costs of securing ABS from this group.³⁸
40. The consequence of having two separate markets – one for ABS from treating low-income households to meet the 20% minimum requirement and one for ABS from treating either low-income or general group households to meet the other 80% of ABS targets – is generally that one set of households are treated at a lower price (£/ABS) compared to if all households were supplied in a single market. Typically, the overall amount of economic rent generated by two separate markets is lower compared to a single market, therefore, more measures can be installed for the same level of spend.
41. On the interaction between the markets for ABS for the 20% low-income minimum requirement and the 80% remainder, note that low-income households feature in both markets (energy suppliers have a choice to treat either households from the low-income group or general group to meet the 80% remainder of their ABS targets). It is expected that energy suppliers will seek to meet their low-income minimum requirements at least cost, so that the most cost-effective low-income homes get supplied in the market associated with the minimum requirement. The low-income homes not supplied in this market are then mixed with other homes from the general group in the market associated with the other 80% of ABS.
42. In line with ECO4³⁹, it is assumed that installers and energy suppliers do not have perfect information on all the homes that require measures, and which also have GB Insulation Scheme eligible households willing to take those measures. With respect to the low-income group, the ECO4 modelling assumed that 20% of the eligible pool of households were found in 2022/23 and then a further 20% of the unfound pool is discovered every year thereafter. This results in about 60% of the eligible pool being identified by the end of ECO4 in 2025/26. The same 'found' pool of low-income households is used in the GB Insulation Scheme modelling. That is, in the first year of the scheme (2023/24), about 36% of the eligible pool is found⁴⁰, rising by a further 20% of the unfound pool every year thereafter. Note that the total GB Insulation Scheme low-income eligible pool is slightly lower than for ECO4 because homes that receive measures under ECO4 are excluded.

³⁸ The 20% low-income minimum requirement has been introduced to mitigate the risk of low-income households being under supported through the GB Insulation Scheme compared to wealthier households. This could occur if treating homes in the general group is much cheaper relative to homes in the low-income group.

³⁹ The ECO4 final stage impact assessment can be accessed here: <https://www.gov.uk/government/consultations/design-of-the-energy-company-obligation-eco4-2022-2026>

⁴⁰ As 20% of the pool of low-income households was assumed to be found through ECO4 in 2022/23, when energy suppliers find a further 20% of the unfound pool in 2023/24 (20% of 80%), this means 36% of the eligible pool is known to suppliers in 2023/24.

43. In the absence of strong evidence to support a specific higher findability rate for the general group, the same 20% findability rate per year is used for the general group (excluding the low-income households already found). In 2023/24, the first 20% of general group homes is found and a further 20% of the unfound pool is discovered every year thereafter.
44. Given the uncertainties on how many households can be found (or make themselves known) to installers and energy suppliers, Section 8 includes the results of testing how sensitive the average cost per ABS is to changing the assumed findability rate. The testing shows that reducing the annual findability rate to 10% increases the average cost per ABS by 14%, whilst increasing the annual findability rate to 30% lowers the average cost by 6%.
45. One factor that could boost how many eligible households are found is the new scheme branding (the Great British Insulation Scheme), designed to resonate more with consumers, and which is expected to be accompanied by greater awareness raising activity by government than has been the case for previous ECO schemes. In addition, a new eligibility checker and self-referral facility will be available on GOV.UK from summer 2023, providing obligated suppliers with a new source of interested and to some extent pre-assessed household prospects.
46. Installers / energy suppliers will incur costs in identifying homes suitable for measures, which also have eligible households willing to take those measures. These costs can include paying third parties for referrals and targeted marketing campaigns, amongst other approaches. In the GB Insulation Scheme modelling, the search cost assumptions which were used in the ECO4 modelling have been used for both the low-income and general groups. The GB Insulation Scheme consultation asked stakeholders for views on whether lower search costs should be used for the general group, and reasonable arguments were made that search costs could be similar. Stakeholders highlighted that many search activities will remain the same, e.g., validating a property can have a measure, and that whilst household eligibility is simpler in the general group, there will be additional costs associated with finding households willing to contribute to measures.
47. Note that the homes which are found each year in the model is random. The ABS targets listed in Section 3 and modelled policy outcomes are based on using the average results from 30 runs of the model.

Post-modelling smoothing of annual ABS targets

48. As a result of the assumption that measures are installed in order of cost-effectiveness, the modelling suggests that the most challenging ABS target (based on ABS per £ spent) should be set for the first year of the scheme, with the least challenging target set for the last year.
49. To provide energy suppliers more flexibility on when the most cost-effective homes are treated and to lower the risk of under delivery in year one, a policy decision has been made to smooth the ABS targets across the three years of the scheme. To do this, the sum of the three annual ABS targets (which is the overall ABS target), are divided across the three years of the scheme in proportion to the scheme budget for each year. Note that the overall obligation on energy suppliers remains the same and therefore the same overall policy outcomes (e.g., number of measures installed) are expected.

50. By smoothing the ABS targets across the years of the scheme, energy suppliers are also provided with a single reference price per ABS (in 2022 prices), which can make planning and long-term contracting with installers easier.

Changes to the analysis since the consultation

51. The key changes to the analysis since the GB Insulation Scheme (then ECO+) Consultation Stage IA are outlined in Table 3.

Table 3: Key changes made in the GB Insulation Scheme analysis since consultation

Area of change	Description of change	Reason for change
Insulation measure costs	The final analysis assumes higher costs for loft, cavity wall, underfloor and solid wall insulation compared to the consultation analysis. The updated cost assumptions have been the primary factor causing the estimated number of homes treated through the scheme to fall by just over 100k compared to the estimate for the preferred option (Option 3) at the consultation stage.	Updated in light of new evidence obtained through independent surveys of installers conducted over November and December 2022, alongside evidence on installation costs received through the consultation and drawing on evidence from the 2020/21 Green Homes Grant Voucher Scheme on how the cost of insulating a property varies in proportion to its size. See Annex A for details on the new cost assumptions.
SAP scoring	In the final analysis, corrections have been applied to the ABS scores modelled for EPC E/F/G properties compared to the consultation analysis - the scores used in the consultation analysis were too low. This has resulted in a higher proportion of EPC E/F/G properties being treated compared to EPC D homes.	The scores allocated to EPC E/F/G properties now accurately reflect those used by Ofgem ⁴¹ .
PAS 2035 retrofit project delivery costs for loft insulation	At consultation stage, loft insulation in low-risk situations and heating controls were assumed to be installed according to the Trustmark Licence Plus (TMLP) standard. The Government's final position is that all measures will need to be delivered in accordance with PAS 2035. This results in a fall in the number of loft insulation installations due to the higher	Change adopted based on consultation and wider stakeholder feedback which emphasised that installation risk can only be assessed via a whole-house retrofit assessment and not by measure.

⁴¹ <https://www.ofgem.gov.uk/publications/eco4-scoring-methodology>

	project delivery costs of PAS 2035 compared to TMLP.	Please see Chapter 6 of the Government Response for more details.
ECO4 minimum EPC requirements	The Government’s final position is that energy suppliers / installers can treat EPC E/F/G homes in the low-income group without needing to demonstrate they cannot meet the ECO4 minimum EPC improvement requirements. This has increased the amount of homes that can be treated through the GB Insulation Scheme.	This policy change has been driven by the complexities, extra time, and extra administration involved in determining whether the ECO4 minimum requirement can be met. Please see Chapter 2 of the Government Response for more details.
Social housing	In the final analysis, all social renters are included in the low-income group, increasing the eligible pool for this group. This has resulted in a higher proportion of socially rented homes being treated by the final policy, mainly switching support away from privately rented homes.	This technical change ensures the GB Insulation Scheme uses the same definition of social housing and, therefore, the low-income group as ECO4. Please see Chapter 2 of the Government Response for more details.

4.2 Quantifying the costs and benefits of the GB Insulation Scheme

52. The impacts of the GB Insulation Scheme have been appraised according to HM Treasury Green Book (2022) guidance⁴² and supplementary guidance on valuing energy use and greenhouse gas emissions⁴³. Impacts are presented in discounted 2022 prices, against a counterfactual where the scheme is not implemented (see Section 3 for the counterfactual assumptions on measure installations).
53. As impacts are usually appraised in government using calendar years, the costs and benefits each financial year of the GB Insulation Scheme are assigned to the calendar year with the biggest overlap. For example, the costs in 2023/24 are assigned to the calendar year 2023.
54. The appraisal period starts in 2023 and ends in 2066.⁴⁴ The year 2066 is the point at which all measures installed in the last year of the policy, 2025/26, will have reached the end of their estimated lifetimes (loft, cavity wall and floor insulation are all assumed to last for 42 years before needing to be replaced).

⁴² HM Treasury (2022) The Green Book: <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

⁴³ DESNZ (January 2023 update) Valuation of energy use and greenhouse gas (GHG) emissions: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁴⁴ The appraisal period used in the GB Insulation Scheme cost-benefit analysis is two years shorter than the appraisal period used in the ECO4 IA (available here: <https://www.gov.uk/government/consultations/design-of-the-energy-company-obligation-eco4-2022-2026>). One year is accounted for by the GB Insulation Scheme starting a year later than ECO4 but with the same final year for measure installations (2025/26). The other year difference between the appraisal periods is due to a correction applied in the GB Insulation Scheme analysis in terms of when a measure’s life is counted from. The GB Insulation Scheme assumes that the year of measure installation counts towards a measure’s life, whilst ECO4 started counting a measure’s life the year after installation. This has a bearing on when measures reach the end of their lives, and hence when the appraisal period ends.

55. Table 4 summarises the societal costs, societal benefits and transfers of wealth (transfer payments) associated with the GB Insulation Scheme. Those impacts that have been quantified in the cost-benefit analysis are highlighted. Annex A sets out the input assumptions for the costs and benefits.

Table 4: Costs, benefits and transfers associated with the GB Insulation Scheme

Type	Impact (those highlighted green are quantified)
Societal cost	Installation capital costs of energy efficiency measures and any associated additional ventilation measures to comply with building regulations and/or PAS 2035 (this includes the costs of labour, materials and equipment to install measures).
	PAS 2035 retrofit project delivery costs, including retrofit assessment, measure design, coordination and lodgement of data with Trustmark.
	Re-installation costs of energy efficiency measures once they reach the end of their life.
	Hidden/hassle costs associated with measure installations - these include the time taken by householders to liaise with an installer, prepare the property for installation and any oversight.
	'Search' costs of finding eligible households who are willing to have measures. The costs of Local Authorities in referring households are included in this.
	Energy suppliers' administration costs
	Scheme administrator (Ofgem) administration costs
	DESNZ staff (including policy, analysis and legal) costs and policy monitoring and evaluation costs
Transfer	Economic rent generated in the markets for ABS
	The offsetting of energy suppliers' costs meeting their GB Insulation Scheme obligations – the government will partially/fully offset these costs in the first year of the scheme through the EPG, with domestic energy consumers covering the rest of suppliers' costs through their energy bills.
	Increases in property values from measures installed (increase in property value and rental value) – this is treated as a transfer of the long-term benefits of an energy efficient home from a property buyer/renter to the property seller/landlord.
	Profits forgone by energy suppliers due to domestic energy consumption falling. This is a transfer of wealth mostly to households but also partly the government in 2023/24 due to the EPG.
Societal benefit	Avoided costs of energy supply (UK production/opportunity costs)
	Improved thermal comfort for households
	Reduced greenhouse gas emissions
	Improved air quality
	Improved health outcomes for households
	Wider economic benefits – supporting and creating jobs in the energy efficiency sector. Growing capacity in the sector will help to improve UK homes in the long run.

	Lower energy imports - reducing the amount of energy inputs required from overseas, reducing the country's reliance on imports and improving security of supply.
Householder benefit	Reduction in spend on energy bills.
Exchequer benefit	Reduction in expenditure on the Energy Price Guarantee scheme once households receiving measures reduce their energy consumption.

5. Outcomes and impacts

5.1 Measures installed and homes treated

56. Table 5 shows modelled gross energy efficiency measure installations due to the GB Insulation Scheme. Also shown are the net/additional measure installations once installations that would occur in the counterfactual are deducted (20% of non-low income households in the general group are assumed to install measures in the counterfactual).

57. Where a measure from the list of qualifying measures under the GB Insulation Scheme (see Table 2) is not shown in Table 5, this is either because the modelling did not install the measure in any home, or the measure is not built into the NHM (this includes pitched roof insulation, room-in-roof insulation, flat roof insulation and park home insulation).⁴⁵

58. The GB Insulation Scheme is expected to be dominated by installations of cavity wall insulation, which is the measure that typically provides the greatest number of ABS per £ spent. However, low levels of loft insulation and underfloor insulation are also predicted. Whilst the ABS that an energy supplier can acquire by installing solid wall insulation can be just over two times greater than cavity wall insulation for a similar property, the cost of solid wall insulation is of the order of seven-times greater. Consequently, the model does not install solid wall insulation.

59. The mix of measures delivered under the scheme could diverge from what is estimated depending on the preferences of households and their willingness to contribute to different measures. As the likelihood and level of such contributions at the dwelling level in the NHM is unknown, their effects on the mix of measures delivered is unknown. Therefore, the most stretching but defensible ABS targets are set according to the installations in Table 5.

Table 5: Modelled measure installations (nearest '000)

Energy efficiency measure	Gross installations	Additional installations
Cavity wall insulation	292,000	258,000
Loft insulation	13,000	13,000
Underfloor insulation	11,000	11,000

⁴⁵ In ECO3, these unmodelled measures accounted for a very small proportion of all measures installed. Room-in-roof insulation accounted for 1.2% of all measures installed, flat roof insulation accounted for 0.1% and park home insulation accounted for 0%. Pitched roof insulation was not recorded in the national statistics for ECO3, though has accounted for only 0.2% of ECO4 measures as of January 2023. Data taken from Household Energy Efficiency Statistics (March 2023): <https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-march-2023>. Note that in the NHM, loft insulation installations will proxy for some pitched roof and room-in-roof insulation installations.

Heating controls (room thermostat & thermostatic radiator valves (TRVs)) ⁴⁶	61,000	61,000
Total measures	376,000	342,000

60. The volume of cavity wall insulation installations in Table 5 is believed to be deliverable. DESNZ's Household Energy Efficiency Statistics show there is still a significant minority of homes without cavity wall insulation. At the end of December 2022, it is estimated that there were around 5.1 million homes without cavity wall insulation in Great Britain, of which 3.8 million are easy to treat standard cavities and 1.3 million are hard to treat.⁴⁷

61. The modelled gross and net/additional numbers of homes treated under the GB Insulation Scheme are shown in Table 6. Table 6 also shows the proportions of gross and additional homes treated that belong to the low-income group, as well as the proportions of homes treated that are exclusive to the general group, i.e., they do not also belong to the low-income group (see Figure for an illustration of the overlap between the groups).

Table 6: Modelled numbers of homes treated (nearest '000) – percentages for sub-groups are in relation to the total number of homes treated

Homes treated in Great Britain	Gross homes		Additional homes	
Total	315,000		281,000	
Low-income group	146,000	46%	146,000	52%
General group (not low-income)	169,000	54%	135,000	48%
EPC D homes	202,000	64%	177,000	63%
EPC E/F/G homes	113,000	36%	104,000	37%
Homes reaching EPC C	104,000	33%	90,000	32%
Owner-occupier homes	270,000	86%	236,000	84%
Privately rented homes	36,000	11%	36,000	13%
Socially rented homes	9,000	3%	9,000	3%
Fuel poor homes (England only)	45,000	17%	44,000	18%
Homes taken out of fuel poverty (England only)	14,000	5%	14,000	6%

62. Under the final policy, whilst the low-income minimum requirement only requires a minimum 20% of the obligation to be met through the treatment of low-income homes, the modelling selects 46% of these homes for treatment. This is not surprising as around two-thirds of households in the general group are also in the low-income group. In reality, the share of low-income households supported may be lower than 46%. This is because household contributions were not modelled at the dwelling level, but instead the overall GB Insulation Scheme spend was increased by the total amount of contributions expected. As richer households are more able and likely to contribute towards measures, they may make up a

⁴⁶ Room thermostats are counted separately from TRVs. That is, a household getting a thermostat and a set of TRVs is classified as having received two heating controls.

⁴⁷ Data taken from the DESNZ 2022 Household Energy Efficiency Statistics: <https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-detailed-report-2022>

larger share of households supported as energy suppliers will need to pay less to treat their homes.

63. Table 6 shows that the GB Insulation Scheme primarily supports owner-occupier households. 86% of the homes modelled to be treated belong to owner-occupiers which compares to 64% of all homes in England belonging to this household group.⁴⁸

64. In terms of the ratio of EPC D homes treated to EPC E/F/G homes treated, the scheme has a slight bias towards treating EPC E/F/G homes. In England, there are around four EPC D homes for every one EPC E/F/G home.⁴⁹ In comparison, the GB Insulation Scheme treats just fewer than two EPC D homes for every one EPC E/F/G home.

65. It is estimated that 17% of households supported through the GB Insulation Scheme will be in fuel poverty. This compares to the latest estimate that 13% of all households in England are fuel poor.⁵⁰ Note however that the tagging of households in the NHM as fuel poor was conducted prior to the spike in energy prices that started in 2023. Therefore, the number of fuel poor households supported through the scheme is likely understated.

5.2 Carbon savings

66. Table 7 presents estimates of how much UK carbon emissions will reduce as a consequence of the additional measures installed through the GB Insulation Scheme.

Table 7: Carbon savings from additional measures installed

Emissions savings (MtCO ₂ e)	Traded	Non-traded
Over Carbon Budget 5 (2028 – 2032)	0.03	0.63
Over lifetime of measures (2023 – 2066)	0.08	5.36

5.3 Social NPVs and equity-weighted NPVs

67. Table 8 sets out the estimated costs and benefits to society of the final policy. Note that these are additional costs and benefits, against a counterfactual where 20% of households in the general group (that are not low-income) would install measures anyway.

Table 8: Social costs and benefits of the GB Insulation Scheme, 2023 – 2066 (£m, 2023 present-values and 2022 prices)

Type of cost or benefit	Value (£m)
Installation capex costs	456
PAS 2035 retrofit project delivery costs	267
Reinstallation costs ⁵¹	13
Hassle/hidden costs	34

⁴⁸ <https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report>. Annex Table 1.1, data for 2021/22.

⁴⁹ <https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report>. Annex Table 2.8, data for 2021 and all tenures.

⁵⁰ <https://www.gov.uk/government/statistics/fuel-poverty-detailed-tables-2023-2022-data>. Table 1 fuel poverty rate for England in 2022.

⁵¹ In present-value terms, 86% of the costs of re-installing measures are due to the replacement of heating controls which are assumed to have a 12-year lifetime. Loft, cavity and underfloor insulation are assumed to have a 42-year lifetime so are only re-installed in the last few years of the appraisal period. If it is assumed that these insulation measures are not re-installed at the end of their life, it would only marginally affect the scheme's NPV.

Search costs	91
Energy suppliers' administration costs	61
DESNZ and Ofgem admin costs	7
<i>Economic rent (transfer payment)</i>	70
Total Costs (excluding rent)	930
Avoided costs of energy supply	557
Value of comfort taking	188
Value of reduced GHG emissions (traded)	19
Value of reduced GHG emissions (non-traded)	959
Value of air quality improvements	38
Total Benefits	1,761
Overall Net Present Value (NPV)	831
Benefit:Cost Ratio	1.89

68. In terms of the costs of the scheme, the major costs are the installation costs and PAS 2035 retrofit project delivery costs. Together these costs account for 72% of all costs, including economic rent. By far the biggest benefit of the scheme relates to reduced greenhouse gas emissions, followed by the avoided costs of energy supply.

69. The GB Insulation Scheme is estimated to have a highly positive NPV. The conclusion that the scheme delivers a positive, net-societal benefit is also robust to changing the assumption that 20% of non-low income general group households install measures in the counterfactual. Even if this assumption were increased to 100%, so that only the benefits associated with measures delivered to low-income households were counted as additional, the NPV of the final policy would still remain positive (+£355m). This is because at the societal level the 'deadweight' assumption mainly relates to who pays for the installation of energy efficiency measures, rather than changing the social costs of those installations.

70. The GB Insulation Scheme has been appraised over a 44-year appraisal period. However, the 'break-even' point by which the societal benefits of the scheme outweigh the upfront societal costs occurs after just 10 years.

71. Table 9 gives the modelled distribution of households receiving energy efficiency measures by income. The GB Insulation Scheme is modelled to give slightly more support to those in the top half of the income distribution. This is partly due to the prevalence of owner-occupier households receiving measures, who tend to be older and richer than average.⁵²

72. Given higher-income households are more able and likely to contribute towards measures, the proportion of higher-income households receiving measures may be even higher than modelled.⁵³ Installers / energy suppliers have an incentive to provide measures to those households who will contribute as contributions will lower their cost of acquiring ABS.

⁵² Note that the average income of all households in lower Council Tax bands (which is the main factor determining eligibility in the general group) is below the population average. However, the GB Insulation Scheme is modelled to disproportionately support owner-occupiers within this group, who have an average income above the population average.

⁵³ Household contributions were not modelled at the dwelling level, but instead the overall spend for the GB Insulation Scheme was increased by the total amount of contributions expected.

Table 9: Modelled distributions of households receiving measures by income decile and average income of measure recipients

Income decile	Share receiving measures	Share of population
1 st (lowest)	6%	10%
2 nd	8%	10%
3 rd	7%	10%
4 th	10%	10%
5 th	11%	10%
6 th	13%	10%
7 th	12%	10%
8 th	12%	10%
9 th	11%	10%
10 th (highest)	9%	10%
Average income (2013/14)⁵⁴	£23,100	£20,700

73. Table 10 compares the NPV of the final policy with a ‘partially equity-weighted NPV’ where the costs and benefits experienced by those households receiving measures are equity-weighted in line with Green Book guidance (see Annex B for the calculations of the equity-weighted NPV). The reason this has been called a partially equity-weighted NPV is because the estimated figure does not take into account the equity/distributional impacts associated with the GB Insulation Scheme being majority funded by domestic energy consumers through the variable element (£/MWh) of their energy bills. If these impacts were taken into account, it would actually increase the equity-weighted NPV as higher income households consume more energy on average and therefore will make higher average contributions to the funding of the scheme.

74. Two equity weights have been calculated, one for households in the low-income group that receive measures (equity-weight = 1.28, meaning their costs and benefits are scaled up by 28%) and one for households that are exclusive to the general group (equity-weight = 0.65). The equity-weights were calculated based on the ratio of each group’s average (median) income compared to the average (median) income of the general population.

75. In line with the GB Insulation Scheme providing slightly more support to those in the top half of the income distribution, the partially equity-weighted NPV is lower than the standard, non-equity weighted NPV. However, it remains large and positive.

Table 10: Partially equity-weighted NPV (£m, 2023 present-values and 2022 prices)

Type of NPV	Value (£m)
Non-equity weighed NPV	831
Partially equity-weighted NPV	669

⁵⁴ Average incomes from the 2013/14 English Housing Survey are used as the National Household Model is based on dwelling and household data from that year of the survey. The average incomes shown are after housing costs and equivalised.

5.4 Average energy bill saving and cost per home treated

76. Table 11 gives the estimated average yearly energy bill saving for measure recipients once all measures are installed and the average policy spend per home (the £1bn obligation on energy suppliers divided by the number of homes treated).

77. The estimated average bill saving uses the DESNZ energy price forecasts for 2023 that were published in the January 2023 update to the Green Book supplementary guidance on valuing energy use and greenhouse gas emissions⁵⁵. The estimated range is based on using the full range of domestic gas retail prices presented in Table 5 of the guidance.

Table 11: Average energy bill saving and energy suppliers' spend per home treated (2022 prices)

	Value (£)
Average annual energy bill saving (using DESNZ energy price forecasts for 2023)	£300-£400
Energy suppliers' spend per home (2022 prices)	£3,200
Energy suppliers' spend per additional home (2022 prices)	£3,600

5.5 Summary of impacts

78. Table 12 summarises the key outcomes and impacts of the GB Insulation Scheme.

Table 12: Summary of outcomes and impacts (2022 prices, where relevant)

Outcome/impact	Value
Policy NPV	£831m
Policy BCR	1.89
Partially equity-weighted NPV	£669m
Gross homes treated	315,000
Percentage of homes treated in fuel poverty (England only)	17%
Percentage of fuel poor homes brought to EPC C	31%
Non-traded GHG savings for CB5 (MtCO ₂ e)	0.65
Average annual energy bill saving	£300-£400
Suppliers' spend per home (includes admin)	£3,200

6. Equality and distributional impacts

79. In line with the government's Public Sector Equality Duty (PSED), this section provides an analysis of how represented different groups of people are amongst the modelled pool of households receiving measures through the GB Insulation Scheme.⁵⁶ The results should be read as illustrative only as the scheme modelling does not take into account how someone's

⁵⁵ DESNZ (January 2023 update) Valuation of energy use and greenhouse gas (GHG) emissions:

<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁵⁶ The PSED requires that government (and other public sector bodies) consider and evaluate the distributional impact of policies on people who share protected characteristics including age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, and sex.

personal characteristics or life situation may affect their likelihood of seeking out support through the scheme or their likelihood of being selected by installers / energy suppliers. Under the GB Insulation Scheme, there are no requirements on energy suppliers to achieve a certain level of representation of a particular PSED group amongst those they support.

80. In the tables below, estimates used for the overall population of households and (where available) owner occupiers are taken from the English Housing Survey (EHS) 2013-14⁵⁷ to align with the dataset underpinning the NHM and ensure appropriate comparison. Given the age of the data used, all results should be treated with caution. The EHS survey is filled out by the household reference person (HRP), who is the designated head of the household. The presented results refer to the answer that person gave.

81. Due to data limitations, it has not been possible to build up a robust picture of measure recipients on the protected characteristics of gender reassignment, pregnancy and maternity, religion or belief, and sex.

6.1 Age

82. Table 13 shows the distribution of supported households by age. Younger (HRP is 16-24 or 25-34 years old) cohorts and the oldest (HRP is 65 or over) cohort receive less support than would be expected while - likely driven by the final policy disproportionately benefitting owner-occupiers - older, working age households (HRP is 35-54 years old) receive a high amount of support when compared to the overall population.

Table 13: Distribution of measure recipients by age (England only)

Age band	Share receiving measures	Share of overall population	Share of owner occupiers
16-24	1%	4%	1%
25-34	14%	15%	8%
35-44	21%	18%	17%
45-54	22%	20%	21%
55-64	16%	16%	19%
65 or over	26%	28%	34%

6.2 Disability

83. Table 14 shows that under the final policy design there is a slightly lower likelihood that a household receiving a measure contains someone with a long-term illness or disability compared to the general population.

Table 14: Distribution of measure recipients by whether a member of the household has a long-term illness or disability (England only)

Member of the household has a long-term illness or disability?	Share receiving measures	Share of overall population
No	70%	67%

⁵⁷ <https://www.gov.uk/government/statistics/english-housing-survey-2013-to-2014-headline-report>

Yes	30%	33%
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6.3 Race

84. Table 15 shows that under the final policy the HRPs of supported households are less likely to come from an ethnic minority background than would be expected when compared to the overall population. This may be explained by the lower proportion of ethnic minorities who are owner occupiers compared to the general population or a regional bias in the distribution of homes that are the most cost effective to treat.

Table 15: Distribution of measure recipients by ethnicity (England only)

Ethnicity	Share receiving measures	Share of overall population	Share of owner occupiers
White	93%	89%	93%
Black	1%	3%	1%
Indian	2%	2%	2%
Pakistani or Bangladeshi	2%	2%	2%
Other	2%	4%	2%
All ethnic minority	7%	11%	7%

6.4 Marriage and civil partnership

85. Due to data limitations, it is not possible to determine directly from the English Housing Survey whether measure recipients are married or in civil partnerships. Instead, information gathered on relationship status is used as a proxy which may not accurately represent these groups.

86. Table 16 indicates that the likelihood of measure recipient HRPs being in a couple is higher than would be expected when considering the distribution of the overall population while the probability of measure recipient HRPs being single or a member of a non-couple multi-person household is lower than would be expected. This pattern may be driven by a higher proportion of couples amongst owner-occupiers.

Table 16: Distribution of measure recipients by relationship status (England Only)

Relationship Status	Share receiving measures	Share of overall population	Share of owner occupiers
Couple	68%	56%	66%
Single	26%	35%	28%
Other multi-person households	7%	8%	6%

6.5 Regional distribution and rurality

87. Table 17 gives the regional breakdown of homes modelled to be treated under the GB Insulation Scheme, while Table 18 presents the estimated proportion of rural homes treated (note that neither of these geographical characteristics are protected under PSED). These estimates should be seen as indicative only, as modelling does not capture all factors that

influence where delivery happens, such as regional differences in measure costs or regional supply chain coverage. Note that the GB Insulation Scheme modelling is based on English housing data only and overall delivery figures are pro-rated to account for Scottish and Welsh households (using the ratios of homes in Scotland and Wales, compared to England). As such, the figures for Scotland and Wales should be treated with caution.

88. Table 17 shows that London receives a lower amount of support under the final policy design in terms of homes treated. One reason for this is the relatively low proportion of owner-occupiers in London. 49% of households are owner-occupiers in London, compared to 67% for the rest of England. London has both more private renters and social renters.⁵⁸ The East of England, North East and West Midlands are also estimated to receive less support in terms of homes treated that might be anticipated when compared to the overall population. Conversely, areas like the South East, North West and South West receive larger amounts of support than might otherwise be expected.

Table 17: Distribution of treated homes by region⁵⁹

Region	Share receiving measures	Share of overall population
East of England	8%	9%
London	4%	13%
South East	18%	14%
North East	2%	4%
North West	16%	12%
Yorkshire and the Humber	9%	9%
East Midlands	7%	7%
West Midlands	8%	9%
South West	14%	9%
Scotland ⁶⁰	9%	9%
Wales ⁶¹	5%	5%

89. Table 18 indicates that slightly more rural homes are projected to be treated through the GB Insulation Scheme than would be expected given the proportion of rural homes in the overall population. This could be driven by rural distribution of owner occupiers in England.

Table 18: Percentage of treated homes by rurality (England only)

Rurality	Share receiving measures	Share of overall population	Share of owner occupiers
Rural	25%	18%	21%

⁵⁸ <https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report>. Annex Table 1.2, data for 2021/22.

⁵⁹ Data for the overall population taken from the 2013 estimates given in the ONS '2018-based: Principal projection edition of this dataset'. The dataset contains projections of households for all GB regions by region and year: <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland>

⁶⁰ Ibid. Scaled using ratio of Scottish household to English household estimates for 2013.

⁶¹ Ibid. Scaled using ratio of Welsh household to English household estimates for 2013.

Not rural	75%	82%	79%
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7. Business impact

7.1 Equivalent Annual Net Direct Cost to Business (EANDCB) & Business Impact Target

90. The costs incurred by energy suppliers acquiring ABS and fulfilling their obligations under the GB Insulation Scheme are treated as direct costs, consistent with their treatment in past ECO IAs. These direct costs total £1bn (2022 prices). When energy suppliers pay installers in the markets for ABS, as they are assumed to do (see Section 4.1), they will be covering the following costs:

- Capital costs of measure installations (£484m)
- PAS 2035 retrofit project delivery costs (£283m)
- Search costs (£95m)
- The economic rent that arises in the markets for ABS (£74m)

Energy suppliers will also directly incur administrative costs (£64m) such as the cost of running IT databases, staff time and reporting measures installed to the scheme administrator (Ofgem). Annex A sets out the input assumptions for the costs covered by energy suppliers.

91. There are assumed to be no direct benefits to business from the scheme. Whilst installers are assumed to benefit from excess profit (economic rent) achieved through installing measures, these benefits are the result of ‘resource used to comply with regulation’ and are therefore not classified as direct benefits for the purpose of the EANDCB, in line with RPC guidance.⁶²

92. Using the Department for Business and Trade’s Impact Assessment Calculator⁶³, the EANDCB of the GB Insulation Scheme is set out in Table 19 below, alongside the business net-present value and Business Impact Target score.⁶⁴ Note that the business NPV has been calculated over the 2023 – 2066 appraisal period, whilst the EANDCB has been calculated over the 3-year lifetime of the scheme as this is the period over which all of the direct costs to business are incurred.

Table 19: Impact of the GB Insulation Scheme on business (2019 prices, 2020 present value base year)

Impact metric	Value (£m)
Business Net Present Value	-353
Estimated annual net direct cost to business (EANDCB)	266
Score against the Business Impact Test	799

7.2 Small and Micro Business Assessment

⁶² <https://www.gov.uk/government/publications/rpc-case-histories-other-bit-methodology-issues-march-2019>

⁶³ Available at: <https://www.gov.uk/government/publications/impact-assessment-calculator--3>

⁶⁴ The Business Impact Target is a cross-government target for the reduction of regulation on business.

93. Businesses that will face a direct regulatory impact because of the GB Insulation Scheme are large domestic energy suppliers with more than 150,000 customer accounts and that supply more than 300GWh of electricity or 700GWh of gas per year.
94. Based on Ofgem data, an estimated 99.76% of domestic energy customers are with obligated suppliers as of 31 December 2021.⁶⁵ Analysis done for a previous BEIS IA⁶⁶ suggests that the average headcount (in March 2017) for suppliers with 150,000 – 200,000 customer accounts (in December 2017) for which data was available was roughly 120. This is expected to still hold given the recent changes in the market, and available information online on the size of suppliers' workforces suggests it is still reasonable to assume no small or micro businesses will be obligated under the GB Insulation Scheme.
95. Some small and micro businesses in energy efficiency supply chains may also be indirectly affected by the increased level of supplier demand for their services because of the scheme. The scheme is expected to have a positive impact on these companies' gross profits, though on the grounds of proportionality, these impacts have not been quantified.

8. Risks and uncertainties

96. The outcomes and impacts of the GB Insulation Scheme are uncertain due to a range of factors. How sensitive the policy NPV and energy suppliers' cost per ABS are to the following assumptions, holding all other factors and the ABS targets constant, has been tested for the final policy position.
- **The assumed capital costs of all measures** – in the central modelling undertaken for the scheme, the costs (in real terms) of underfloor, loft and cavity wall insulation were increased compared to the costs assumed in ECO4 modelling⁶⁷ (see Annex A for the new measure cost assumptions). Two alternative scenarios have been modelled: a low measure capital costs scenario where all central cost assumptions are reduced by 20%, and a high measure capital costs scenario where a 20% uplift is applied.
 - **The rate at which eligible households willing to have measures are found** – in the central scheme modelling, it is assumed that every year of the scheme, installers / energy suppliers find 20% of the eligible households who had not been identified prior to the year. Two alternative scenarios have been modelled: installers / energy suppliers finding households at a rate of 10% per year (low findability) and at a rate of 30% per year (high findability).
 - **The assumed search costs for households in the general group** - in the central scheme modelling, the search costs assumptions which were used in the ECO4 modelling have been used for both households in the low-income group and general group. In reality, the costs of finding eligible households willing to have measures in the general group may be lower. This is because there are more households in the general group compared to the low-income group and because the eligibility requirements for the general group, based on Council Tax bands, are simpler. Given

⁶⁵ Source: Ofgem

⁶⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/716463/Warm_Home_Discount_FS_IA_Signed.pdf

⁶⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065825/eco4-final-ia.pdf

this, an alternative scenario has been modelled where the search costs for households in the general group (excluding the low-income households) have been halved.

- **PAS 2035 retrofit project delivery costs for loft installations** – in the central scheme modelling, the PAS 2035 retrofit project delivery costs, including retrofit assessment, measure design, coordination and lodgement of data with Trustmark, is assumed to be the same for all measures. Given loft installations may require a relatively more straightforward process around installation, an alternative scenario has been modelled where the project delivery costs for loft installations has been halved.
- **The assumed level of customer contributions from the general group** (for energy suppliers' cost per ABS only) - in the central scheme modelling, it is assumed that installers / energy suppliers will be able to leverage £80m of household contributions from the general group. An alternative scenario has been modelled where suppliers / installers are unable to leverage customer contributions.

97. Figure 3 and Figure 4, respectively, show the proportional differences between the policy NPV and energy suppliers' cost per ABS in the alternative scenarios described above with the results in the central scenario. Note that in all scenarios the annual ABS targets that energy suppliers have to achieve is the same, with the alternative scenarios showing how the NPV and cost per ABS associated with meeting those targets change under different assumptions.

Figure 3: NPVs in alternative scenarios compared to central NPV for the final position

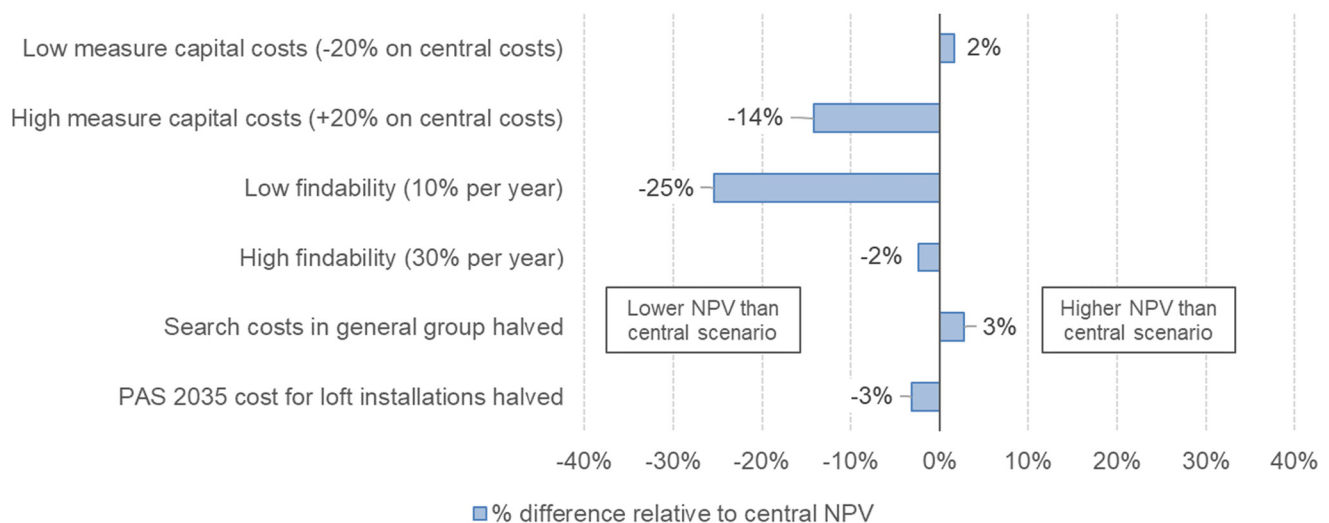
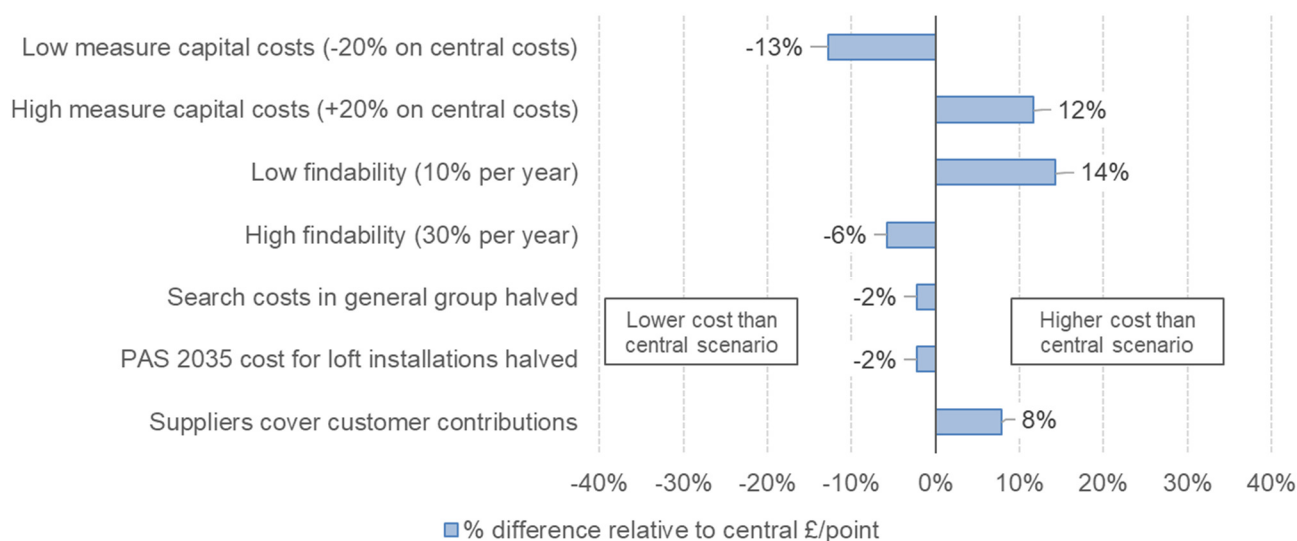


Figure 4: Cost per ABS in alternative scenarios compared to central scenario for the final position



98. The results in Figure 3 demonstrate that the positive NPV of the final policy position option (+£831m) is robust to the alternative assumptions on measure capital costs, findability rates, search costs in the general group and PAS 2035 costs for loft installations. That is, none of the alternative assumptions cause the NPV to become negative. The biggest reduction in the NPV is associated with assuming a lower findability rate (10% rather than 20% as per the central findability assumption), though this would still leave a highly positive NPV of +£620m.

99. Lowering measure costs increases the NPV as it allows the suppliers to achieve the same ABS target for less and vice versa. Based on the figures in Table 8 (Social costs and benefits of the scheme) capital expenditure on measures is equivalent to just over half of the policy NPV (55%). Therefore, overall capital expenditure would have to almost triple to cause the NPV to turn negative.

100. On energy suppliers' cost per ABS, reducing the cost of measures results in a 13% reduction in energy suppliers' costs, whilst adding an uplift of 20% results in a 12% increase. The reason energy suppliers' overall costs do not increase by -20/+20% is because measure capital costs account for just under half of total energy supplier costs.

101. As highlighted above, lowering the findability rate is estimated to reduce the NPV. Reducing the assumed findability to 10% makes it more difficult for suppliers to find suitable, cost-effective homes with households willing to have measures. In this scenario, to achieve the ABS target, 32% fewer energy inefficient homes in EPC bands E, F and G are treated while the number of relatively more energy efficient homes in EPC band D treated increases by 18% when compared to the central case. Overall, 6% more homes must be treated in the low findability scenario, increasing the cost to achieve the ABS target by 14% (see Figure 4) and lowering the NPV by 25% (see Figure 3).

102. Counterintuitively, improving the assumed findability of all households is modelled to slightly worsen the NPV of the policy by 2%. In the alternative scenario with a 30% findability rate, the total number of homes treated is 2% lower than the number treated in the central scenario. In the case of a higher findability rate, the model selects many more mid-terrace homes for treatment (+33% compared to the central scenario) and fewer end-terrace homes (-52%) and semi-detached homes (-18%). As insulating the two walls of a mid-terrace home

is typically less impactful in terms of reducing energy consumption compared to insulating end-terrace and semi-detached homes, the scenario with a higher findability rate yields lower energy savings overall and hence a lower NPV. As homes are easier to find, however, the overall cost to energy suppliers of achieving their ABS targets are modelled to fall by 6% (see Figure 4).

103. Halving the search costs in the general group (excluding the low-income households) is modelled to reduce overall search costs by 29% and improve the NPV of the policy by 3%. Compared to the central scenario, this alternative scenario sees a slight fall in the number of homes treated (-2%), and a slight increase in the proportion of these (+2%) which are from the general group (there is a 3% decrease in the number of low-income homes treated). With the lower search costs, the overall costs to energy suppliers of meeting their ABS targets are estimated to fall by 2% (see Figure 4).
104. Lowering the PAS 2035 retrofit project delivery costs for loft installations sees a large increase in the number of loft installations (over 100% from a small base) and heating controls (over 50%). The partial project scores for loft are typically lower than for other measures and it is only when combined with secondary heating controls that they become cost-effective even in this lower PAS 2035 cost scenario. It is the additional score from the increased number of heating controls that enables supplier to meet their overall ABS target. The lower costs for the PAS 2035 process with loft installations leads to a 2% fall in the overall costs to energy suppliers of meeting their ABS targets (see Figure 4).
105. Were it not possible to find homes (in the general group) willing to contribute towards the cost of installation, the total amount of contributions assumed in the modelling would fall to energy suppliers. In this scenario, the overall costs to energy suppliers of meeting their ABS targets are estimated to rise by 8% (see Figure 4).
106. Other factors, which have not been tested through modelling, that could affect the outcomes and impacts of the GB Insulation Scheme include:
 - **Household contributions driving a different measure mix** – the only insulation measures chosen in the modelling were cavity wall insulation, loft insulation and underfloor insulation. This is because these measures typically offer much higher annual bill savings (ABS) per £ spent. Household contributions are factored into the modelling by increasing the portion of the Scheme spend that is not ringfenced for the low-income group by £80m (in 2022 prices) where contributions are only expected from the general group. Implicit in this assumption is that households are willing to contribute to all energy efficiency measures equally, and this means energy suppliers' modelled preference for delivering underfloor, loft and cavity wall insulation is unchanged compared to a scenario without household contributions. In reality, there could be uptake of higher-cost measures (e.g., solid wall insulation) that are not installed in the modelling of the scheme. Households and landlords may make sizeable contributions to these measures, thereby making them more cost-effective for installers / energy suppliers to install.
 - **Uplifts driving the measure mix** – uplifts for rural properties and the installation of innovation measures are not included in scheme modelling. There is insufficiently granular evidence for the impact on cost for rural installations (which would change their cost-effectiveness) or data on the willingness of consumers to have innovation measures installed (over standard measure types) to include them in the model. The

presence of these uplifts may result in differences between the estimated results from the modelling and actual delivery.

- **In-fill** – modelling does not cover homes permitted under ‘in-fill’⁶⁸, for example where a block of flats or street includes mixed tenure occupants, as the modelling is unable to account for location of properties (needed for in-fill modelling). This means the eligible pool may be slightly larger than modelled and the costs for energy suppliers of meeting their ABS targets could be slightly lower. However, the impacts are not expected to be large.
- **Changes to SAP**⁶⁹ – in the modelling of the scheme, the starting SAP ratings (and therefore EPC Bands) of homes are determined according to SAP/RdSaP 2012⁷⁰. This determines which homes in the housing stock meet the Scheme EPC-eligibility requirements and affects the ABS available from treating homes (ABS are based on the starting EPC Band of a home). The Government is considering updating how the starting SAP ratings for homes are determined for ECO4 and the GB Insulation Scheme. The proposal is to use SAP/RdSAP 10⁷¹. Modelling undertaken for ECO4 indicated that the switch to SAP/RdSAP 10 would increase the number of electrically heated homes that get treated under the scheme, though overall costs for suppliers would only marginally change (within 1%)⁷². Such modelling has not been undertaken for this impact assessment.
- **Supply chain risks** – the GB Insulation Scheme will run alongside several other Government energy efficiency schemes and there may be risks associated with local supply chains being overstretched. However, ECO is an established policy with a strong supply chain in place, therefore this risk is expected to be smaller for ECO4 and the GB Insulation Scheme. The government also has taken steps to support growth in the installer supply chain, including investing in skills and training with the 2021 Skills Training Competition⁷³ worth £6 million and the Home Decarbonisation Skills Training Competition⁷⁴ worth £9.2 million.
- **Imperfect competition in the markets for ABS** – as explained in Section 4, the market for ABS between installers as the providers/sellers and energy suppliers as the consumers is assumed, for simplicity, to be perfectly competitive⁷⁵. This means that no participant in the market is individually able to influence the market price and there is perfect information on how much installers are charging and energy suppliers paying. The more the real-life market for ABS diverges from the perfect competition assumption, the more the costs to energy suppliers of meeting their ABS targets will differ from what has been modelled. For example, if an installer has a significant market share in terms of cavity wall insulation delivery, they may be able to command a higher price per ABS where an energy supplier would struggle to find an alternative provider. Conversely, if an installer does not have visibility on what all energy suppliers

⁶⁸ In-fill is a mechanism which allows homes to be treated under ECO schemes, even if their occupants do not meet the eligibility criteria. In-fill flats must be located within the same block as the flat occupied by ECO eligible households, whilst in-fill houses must be located on the same street as the house occupied by ECO eligible households and be SAP band D-G. For the GB Insulation Scheme, in-fill can be used when treating a block of flats with either solid wall insulation or cavity wall insulation, whilst for houses in-fill would be restricted to solid wall insulation only.

⁶⁹ The Standard Assessment Procedure (SAP) is the methodology used to determine and rate the energy performance of properties for EPCs.

⁷⁰ <https://www.bregroup.com/sap/standard-assessment-procedure-sap-2012/>

⁷¹ <https://www.bregroup.com/sap/sap10/>

⁷² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065825/eco4-final-ia.pdf

⁷³ <https://www.gov.uk/guidance/apply-for-free-or-subsidised-training-under-the-green-homes-grant-skills-training-competition-scheme>

⁷⁴ <https://www.gov.uk/government/publications/home-decarbonisation-skills-training-competition>

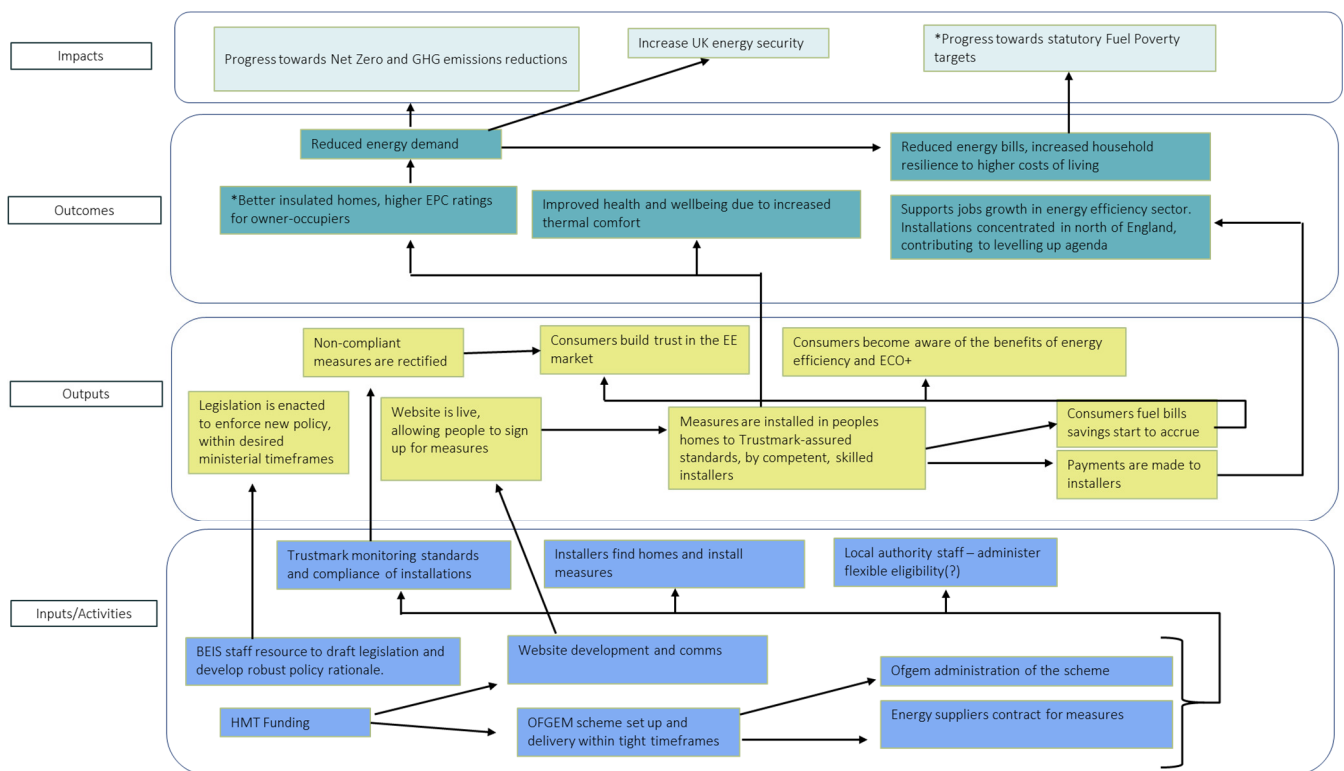
⁷⁵ Assuming something other than perfect competition is not practical in terms of modelling ECO, nor is there a robust evidence base for an alternative assumption.

are paying for ABS, they may be undercharging a particular energy supplier who could, in turn, meet their ABS targets at a lower cost than modelled.

9. Monitoring and evaluation

107. The strategic aims of the GB Insulation Scheme align with the intended outcomes and impacts, as shown in the Theory of Change in Figure 5. These are to: better insulate homes, reduce energy bills, and contribute towards the UK’s fuel poverty and net zero targets. The Theory of Change shows how we expect the GB Insulation Scheme to achieve its high-level aims. It sets out the pathways to impact which result from the scheme activities, outputs and outcomes. This Theory of Change has been developed in consultation with those involved in policy design and steered by an M&E adviser in the Department for Energy Security and Net Zero (DESNZ). Updates have been made to the Theory of Change as the policy design has evolved. The monitoring and evaluation (M&E) approach will assess the extent to which the GB Insulation Scheme has been successful in achieving these aims.

Figure 5: Provisional Theory of Change for the GB Insulation Scheme



108. A full list of monitoring and evaluation questions will be developed during the planning phase. However, some potential high-level questions, derived from the Theory of Change, and discussions with policy and analytical stakeholders, include:

- Has the GB Insulation Scheme delivered energy bills savings?
- What were the characteristics of GB Insulation Scheme households?
- What were the experiences of consumers where measures were installed under the GB Insulation Scheme and were they satisfied?
- Have suppliers delivered measures in the most cost-effective way?

109. The overall approach to M&E accounts for the strong existing evidence around ECO scheme implementation, current and future evaluation activity on ECO4, and the quality of scheme data available. To assess performance of the scheme against its stated objectives, we will track the outcomes of the scheme using the Ofgem data and publish this as Official Statistics. This will allow us to monitor the impacts of the scheme and ascertain whether it met its higher-level objectives as set out in the Theory of Change. Alongside this, we will conduct a focused evaluation, which will include fieldwork with household and non-household stakeholders. This evaluation will provide further, more detailed evidence on impacts of the scheme and will also involve deep dives into priority areas of policy interest. The design of the evaluation is such that we will be able to explore questions of specific relevance to the delivery of the GB Insulation Scheme, whilst ensuring resource is focused on areas where there is not already extensive evidence from previous and ongoing evaluations of the ECO scheme. This is therefore deemed to be the most cost effective and proportionate approach.
110. The GB Insulation Scheme will be subject to monitoring and regular reporting of benefits via Ofgem who will collect data from energy suppliers on installations completed, measures installed, and households treated. When laying the regulations for the GB Insulation Scheme, we will include the same obligations for Ofgem as those under ECO4. Data will be provided to DESNZ monthly and will be published as Official Statistics. This will partly be used to track delivery of the scheme and performance against expectations. Relevant variables include: Approved ECO measures by category, Measure type, Measure installation date, Measure delivery status by company, Installation address.
111. In addition, the Official Statistics will be the main tool through which we will monitor progress of the scheme towards its stated objectives, as shown in the Theory of Change above. The core outcomes which will be assessed are:
- Carbon savings
 - Lifetime bill savings
 - Household characteristics
 - The average delivery costs
 - Regional breakdowns of households in receipt of measures
112. These measures align with key outcomes and impacts in the Theory of Change. Specifically, we will be able to track progress towards net zero goals through monitoring carbon savings, showing the extent to which the GB Insulation Scheme is helping meet carbon budgets. Through this, we will be able to track impacts of the scheme as distinct from those of other similar schemes (e.g. ECO4). Estimated lifetime bills savings will provide further evidence on the extent to which the GB Insulation Scheme has reduced energy bills for households and helped meet UK energy security goals.
113. The GB Insulation Scheme evaluation will supplement evidence collected through the ECO4 evaluation, as both schemes will run in parallel. The proposed approach to the ECO4 evaluation is set out in the ECO4 Final Stage Impact Assessment⁷⁶. This evaluation is ongoing and will use a theory-based design to examine the causal pathways and contribution of ECO4 to its intended outcomes and impacts. The research will entail interviews, surveys and quasi-ethnographic fieldwork with household and non-household stakeholders (including managing agents, Ofgem, energy company representatives and local authorities).

⁷⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065825/eco4-final-ia.pdf

114. The ECO4 evaluation is exhaustive, building logically on the strong evidence base already generated by the preceding evaluation of ECO2, ECO2t and ECO3. Given this, the GB Insulation Scheme evaluation is more focused on specific areas where there is a need for further policy learning. Full detail on the proposed evaluation approach is set out in Annex C. This includes a summary of current monitoring and evaluation evidence, which shows the evidence gaps and where the GB Insulation Scheme M&E will contribute to filling these gaps. It also expands on the approaches to monitoring and evaluation set out in this section, including some high-level detail on data collection approaches, and possible evaluation questions.
115. The M&E will be used by policy leads and analysts to explore whether the assumptions and modelled impacts of the scheme, as set out in this Impact Assessment, have been met. It will strengthen the wider evidence base on issues around the costs of delivering energy efficiency measures, and the challenges faced by the supply chain.

Annex A. Input assumptions for costs and benefits

1. This annex sets out the input assumptions used for quantified costs and benefits in the GB Insulation Scheme modelling.

A.1 Installation capital costs of energy efficiency measures

2. The Department for Energy Security and Net Zero (DESNZ) has updated the assumed costs of installing cavity wall insulation (into easy-to-treat, standard cavities⁷⁷) and loft insulation from those used in the GB Insulation Scheme (then ECO+) consultation modelling. The department's new cost models for these insulation measures make use of results from a survey of installers carried out over November and December 2022, which provided estimates of the typical/average costs of insulating properties according to their archetype, i.e., according to whether they are a bungalow, flat, terrace, etc.⁷⁸ Data on installations from the 2020/21 Green Homes Grant Vouchers Scheme was used to validate the observed proportional differences in insulating homes of different archetype and adjust where appropriate. The Vouchers Scheme data was also used to estimate how the costs of installing cavity wall insulation or loft insulation scaled in proportion to property size, as measured by floor area.
3. The new cost models for cavity wall insulation and loft insulation are no longer based on estimated fixed costs and unit costs (£/m²). Instead, a bespoke cost model has been created for each property archetype based on:
 - i) The estimated cost of insulating a property of that archetype when it is a particular size (measured by floor area in m²). These estimated costs are referred to as the 'reference cost' associated with insulating the 'reference property'. They provide the anchor for then estimating the costs of insulating smaller and bigger properties.
 - ii) The estimated percentage increase/decrease in cost given a proportional increase/decrease in the size of the property (e.g., percentage increase in cost given a 1% increase in floor area). These estimated elasticities of costs with respect to property size can then be applied to the 'reference cost' to estimate the costs of insulate a property of any size.
4. Table 20 sets out for each property archetype the assumed cost of installing cavity wall insulation into the 'reference property' and elasticity of this cost with respect to floor area. Table 21 sets out the assumptions on the costs of installing top-up loft insulation. For virgin loft insulation, it is assumed that costs are 12% higher than those presented in Table 21, based on evidence from the Green Homes Grant Voucher Scheme.

⁷⁷ The assumed cost of installing cavity wall insulation into hard-to-treat, non-standard cavities has not been updated from those used in the GB Insulation Scheme (then ECO+) consultation modelling where a fixed cost of £2,720 and variable cost of £48/m² (based on wall area) was assumed (2021 prices). Hard-to-treat cavity wall insulation is not included in modelling for the GB Insulation Scheme due to the relatively high £/ABS cost associated with the measure. That is, the measure is never modelled to be installed. The department will review and update the assumed costs for hard-to-treat cavity wall insulation in future IAs, where relevant.

⁷⁸ The survey of installers was carried out by Cambridge Architectural Research on behalf of BEIS (now DESNZ). Telephone interviews were carried out with 18 CWI installers and 17 loft insulation installers from all parts of England, Scotland and Wales. The installer companies that took part in the survey ranged in scale, from 3 to 75 members of staff.

Table 20: Assumed costs of installing cavity wall insulation into easy-to-treat, standard cavities (2022 prices)

Property archetype	Reference property size (m ² floor area)	Cost of insulating reference property (£)	Change in cost given 1% change in floor area ⁷⁹
Converted flat	54	940	± 0.24%
Purpose built flat	54	940	± 0.44%
Bungalow	120	1,750	± 0.33%
Mid terrace	100	1,140	± 0.33%
End terrace	120	1,750	± 0.25%
Semi detached	120	1,750	± 0.25%
Detached	120	2,180	± 0.25%

Table 21: Assumed costs of installing top-up loft insulation (2022 prices)⁸⁰

Property archetype	Reference property size (m ² floor area)	Cost of insulating reference property (£)	Change in cost given 1% change in floor area ⁷²
Converted flat	54	825	± 0.32%
Purpose built flat	54	825	± 0.42%
Bungalow	120	1,550	± 0.39%
Mid terrace	120	1,010	± 0.31%
End terrace	120	1,060	± 0.26%
Semi detached	175	1,170	± 0.26%
Detached	150	1,170	± 0.42%

5. Using the data in Table 20 / Table 21, the following function is used to estimate the cost of insulating a property of any size:

$$\text{Measure installation cost} = RPC + \left[RPC \times (\varepsilon \times 100) \times \frac{(FA - RFA)}{RFA} \right]$$

Where:

- *RPC* = the cost of insulating the reference property for the archetype under consideration (£).
- ε = the elasticity of cost with respect to floor area as a percentage. That is, the percentage increase in cost given a 1% increase in floor area. Note that the percentage elasticity is multiplied by 100 in the function to give the elasticity as a number. For example, an elasticity of 0.25% is multiplied by 100 to give 0.25.
- *FA* = the floor area of the property the estimated installation cost will relate to (in m²)
- *RFA* = the floor area of the reference property for the relevant archetype (in m²).

⁷⁹ A positive sign on a percentage relates to increasing the floor area and costs increasing, whilst a negative sign relates to reducing the floor area and costs falling.

⁸⁰ The assumed costs for loft insulation exclude the use of spray foam.

6. The other insulation measures incorporated into the NHM model used for setting the GB Insulation Scheme ABS targets are underfloor insulation and solid wall insulation. For the GB Insulation Scheme (then ECO+) consultation modelling, the assumed cost of underfloor insulation (£37/m² of floor area, in 2021 prices) was based on cost data from the Green Homes Grant Vouchers Scheme. In the final modelling of the GB Insulation Scheme, new cost models for underfloor insulation have been created that split the cost into a fixed cost component and variable cost component. These cost models are based on regression analysis of the Vouchers Scheme data and are presented in Table 22. Costs have been uplifted to account for inflation in costs since the Vouchers Scheme took place, in line with the inflation observed in cavity wall insulation and loft insulation costs, as evidenced by the recent survey work with installers. The variable cost of installing underfloor insulation into typically single-storey dwellings (flats and bungalows) is estimated to be double the cost for typically multi-storey dwellings. This is because a 1m² increase in the floor area of single-storey dwellings will relate to the treatable ground floor, whilst a 1m² increase in the floor area of multi-storey dwellings does not.

Table 22: Assumed costs of installing underfloor insulation (2022 prices)

Property archetype	Fixed cost (£)	Variable cost (£/m ² floor area)
Flats and bungalows	2,000	8.91
Terraces, semi-detached and detached	2,000	4.45

7. With respect to solid wall insulation, the GB Insulation Scheme (then ECO+) consultation modelling assumed a fixed cost of £4,200 and variable cost of £124/m² wall area (£107/m² for bungalows). These figures were based on data supplied by installers to BEIS (now DESNZ) in 2021. For the final modelling of the GB Insulation Scheme, these values have been uplifted in line with the recent inflation observed for cavity wall insulation and loft insulation. Note that with or without this uplift, solid wall insulation is not modelled to be installed under the final GB Insulation Scheme policy. Table 23 gives the updated assumed costs for solid wall insulation.

Table 23: Assumed costs of installing (external) solid wall insulation (2022 prices)

Property archetype	Fixed cost (£)	Variable cost (£/m ² wall area)
Bungalow	5,000	128
All other archetypes	5,000	149

8. The cost assumptions for the heating controls that can be installed into the homes of low-income owner-occupiers under the GB Insulation Scheme remain the same as those used in the consultation modelling. These are set out in Table 24.

Table 24: Assumed costs of installing heating controls (2022 prices)

Heating control	Cost assumption
Room thermostat	£100 per thermostat
Boiler programmer	£80 per programmer
Thermostatic radiator valves (TRVs)	£200 labour cost + £30 per TRV

9. To account for potential future inflation in measure costs, all measure costs (in nominal terms) were increased by 5% per annum from 2022 to 2025.⁸¹ The 5% per annum adjustment was based on the average level of inflation observed for 'insulating materials (thermal or acoustic)' between 2016-2021, derived from BEIS statistics.⁸²

A.2 Hidden/hassle costs associated with measure installations

10. Hidden/hassle costs include the cost of time taken by householders to liaise with an installer, prepare the property for measure installation and any oversight, as well as clean-up or redecoration costs associated with the installation. Assumed hidden/hassle costs are shown in Table 25 and are drawn from an ECOFYS report⁸³.

Table 25: Hidden/hassle cost assumptions used in the GB Insulation Scheme modelling (2022 prices)

Measure description	Estimated hidden cost to household (£)
Loft insulation	142
Cavity wall insulation	100
Solid wall insulation (external)	231
Underfloor insulation	173
Heating controls (any of room thermostat, boiler programmer and thermostatic radiator valves)	53

A.3 'Search' costs of finding ECO-eligible households who are willing to have measures

11. The assumed search costs are shown in Table 26. These assumptions were derived from a supply chain survey and stakeholder feedback during the ECO4 policy development process. All search costs are per successful install (for example, if two eligible households needed to be found per successful installation then the costs of finding both households is presented below).

Table 26: Search cost assumptions used in the GB Insulation Scheme modelling (2022 prices)

Measure description	Homes on the gas grid (£)	Homes off the gas grid (£)
Loft insulation	200	450
Cavity wall insulation	275	450
Solid wall insulation (external)	305	450
Floor insulation	305	450

⁸¹ The increases in measure costs in real terms will be less than these increases in nominal terms. The real term increases will exclude increases in the general level of prices across all goods and services in the economy, for which HM Treasury's GDP deflator series is used: <https://www.gov.uk/government/collections/gdp-deflators-at-market-prices-and-money-gdp>

⁸² <https://www.data.gov.uk/dataset/75ee36ed-21f7-4d7b-9e7c-f5bf4546145d/monthly-statistics-of-building-materials-and-components>

⁸³ ECOFYS (2009) "The hidden costs and benefits of domestic energy efficiency and carbon saving measures"

Heating controls (any of room thermostat, boiler programmer and thermostatic radiator valves) ⁸⁴	0	0
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A.4 Energy suppliers' administration costs

12. In delivering the GB Insulation Scheme, suppliers will incur administrative costs. These will vary by supplier, depending on their setup, but include items such as the cost of running IT databases, staff time and reporting measures installed to the administrator (Ofgem). They will also include indirect costs, such as a share of the suppliers' accommodation costs, human resources and legal costs.
13. In the final GB Insulation Scheme modelling, 5.9% of annual Scheme spend (including household contributions) is assumed to go towards energy suppliers' administration costs, which is in line with the administration costs reported by energy suppliers under ECO3⁸⁵ (statistics are not available for ECO4). As part of the consultation on the GB Insulation Scheme, stakeholders were asked whether they expected administration costs to be any lower than this, due to potential synergies with ECO4 delivery. 78% of respondents stating that they did not expect this⁸⁶, therefore, the consultation stage IA assumption on administration costs has been retained.

A.5 BEIS and Ofgem administration costs

14. Estimates of BEIS administration costs in relation to the GB Insulation Scheme were internally estimated and include all aspects of policy implementation, stakeholder engagement, the development of Regulations, wider administration, and monitoring and evaluation activities required to deliver the scheme. Estimates of Ofgem administration costs were provided by Ofgem.

A.6 Avoided costs of energy supply

15. Reductions in energy consumption reduce the use of resources in the production, transportation, and final supply and use of energy. The reductions in energy consumption brought about by the GB Insulation Scheme were valued using the long-run variable cost (LRVC) of energy supply estimates in Green Book supplementary guidance⁸⁷.

A.7 Improved thermal comfort for households

16. Proposals that improve homes' energy efficiency have the effect of reducing households' energy bills. This frees up funds which can be spent on energy or other goods and services. Any resulting increase in energy use is known as the "rebound effect". The existing, standard assumption in DESNZ modelling of energy efficiency policies is a 15% direct rebound effect⁸⁸

⁸⁴ Search costs for heating controls are assumed to be zero as they are an optional secondary measure for households in the low-income group.

⁸⁵ Household Energy Efficiency Statistics (March 2023), Table 6.6: <https://www.gov.uk/government/statistics/household-energy-efficiency-statistics-headline-release-march-2023>

⁸⁶ See the summary of responses for Question 13 of the GB Insulation Scheme consultation within the Government Response: <https://www.gov.uk/government/consultations/design-of-the-energy-company-obligation-eco-2023-2026>

⁸⁷ Tables 9-12: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁸⁸ See https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43000/3603-green-deal-eco-ia.pdf, p.132 for more details on the sources of this 15% assumption.

- this means that of the energy savings delivered by a measure, 15% of those savings do not materialise in practice because the household uses their bill savings to increase their energy consumption by this amount. The household does so to live in a warmer, more comfortable home.

17. The benefits to households of a warmer home are monetised by multiplying the rebound in energy consumption savings (the 15%) by the retail prices of energy in the Green Book supplementary guidance⁸⁹ (the retail price acts as a proxy for the consumer's willingness-to pay).

A.8 Reduced greenhouse gas emissions

18. Savings of greenhouse gas emissions (in MtCO₂e) as a result of reduced energy consumption due to the GB Insulation Scheme were quantified using the fuel emissions factors in Green Book supplementary guidance.⁹⁰ The emissions savings were then monetised using the carbon values from Table 3 of that guidance.

A.9 Improved air quality

19. Air quality damage costs from Green Book supplementary guidance⁹¹ were used to monetise the benefits associated with improvements in air quality resulting from reduced energy consumption.

⁸⁹ Tables 4-7: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁹⁰ Tables 1 and 2a: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

⁹¹ Table 15: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

Annex B. Equity-weighted NPV calculations

1. To calculate the social net-present value (NPV) of a policy where the costs and benefits for affected households are equity weighted, the first step is to identify the impacts for these households. Table 27 lists the monetised impacts of the GB Insulation Scheme by affected group. Note that the 'energy bill savings' benefit for households is not completely accounted for in the calculation of the standard NPV. This is because some of this benefit is a transfer of wealth from energy suppliers who forgo profit when households reduce their energy consumption.

Table 27: Monetised impacts of the GB Insulation Scheme by affected group

Affected group	Costs	Benefits
Energy suppliers	<ul style="list-style-type: none"> • Funding of measure installation costs • Funding of PAS 2035 costs • Search costs • Administration costs • Paying the economic rent associated with ABS • Profit losses associated with reduced energy consumption 	<ul style="list-style-type: none"> • Compensation of costs incurred meeting ABS targets (assumed to be paid by government and then domestic energy consumers)
GB Insulation Scheme measure recipient households	<ul style="list-style-type: none"> • Contributions to measure installation costs • Measure re-installation costs, including VAT. • Hidden/hassle costs 	<ul style="list-style-type: none"> • Energy bill savings (post-comfort taking). • Comfort benefits.
Government	<ul style="list-style-type: none"> • Compensating energy suppliers' costs meeting ABS targets through the Energy Price Guarantee in year one. • Covering BEIS and Ofgem scheme administration costs. 	<ul style="list-style-type: none"> • VAT collected when households re-install measures.
Energy efficiency measure installers	<ul style="list-style-type: none"> • No costs assumed – energy suppliers and households cover the costs of measures. 	<ul style="list-style-type: none"> • Economic rent collected in the markets for ABS.
Society	<ul style="list-style-type: none"> • No costs outside of the groups listed above assumed. 	<ul style="list-style-type: none"> • Reduced greenhouse gas emissions. • Improved air quality.

2. The next step is to assign equity-weights to the affected households. This is done using the average incomes of affected households and these are set out in Table 28 for the final GB Insulation Scheme policy. As only non-low income households in the general group are

assumed to contribute towards measure installation costs, these households are treated separately from low-income households.

Table 28: Median incomes of households receiving measures through the GB Insulation Scheme (2013/14 data)

Household group	Average income (£)
All households receiving measures	£23,100
Low-income households receiving measures	£17,100
General group households receiving measures (not low-income)	£28,900

- HM Treasury’s Green Book guidance recommends that equity-weights are calculated by dividing the median equivalised income of all households in the population (estimated at £20,700 using 2013/14 data) by the median equivalised income of households affected by the policy, and then raising this number to the power of 1.3 (an estimate of the elasticity of the marginal utility of income). Following this approach, the equity weights for households receiving GB Insulation Scheme measures are as set out in Table 29. These equity weights were used to calculate the partially equity-weighted NPV in Table 10.

Table 29: Equity-weights assigned to households receiving measures through the GB Insulation Scheme

Type of household	Equity weighting
All households receiving measures	0.87
Low-income households receiving measures	1.28
General group households receiving measures (not low-income)	0.65

Annex C. Further detail on monitoring and evaluation

1. This annex provides more detail about the proposed M&E approach, expanding on the high-level plan set out in Chapter 9.
2. The most recent available evaluation evidence from ECO is from the ECO2t and ECO3 phases of the scheme. This evaluation involved a three-wave household survey and follow-on interviews with households who received measures under these two phases of the scheme. There has so far been one published report from this evaluation (Wave 1)⁹², with a final report due to be published in summer 2023. The Wave 1 report used quantitative and qualitative approaches to explore the characteristics of properties and households reached by the scheme, whether and how households benefitted from the scheme and their experiences of installation. Some key findings were that i) households who benefitted tended to be lower income⁹³ ii) 4 in 10 households perceived that ECO had led to decreases in their energy bills compared with before the measures were installed and iii) most households were satisfied with the process of having a measure installed, due to fulfilled expectations and trust in installers.
3. As well as finding high overall levels of satisfaction with installation, the ECO evaluation found that households experienced a range of wider benefits including increased thermal comfort, lower energy bills and improved health and wellbeing. These positive experiences demonstrate the varied household-level benefits of energy efficiency installations under ECO, thus supporting the case for expanding support under the GB Insulation Scheme. This is especially the case as the GB Insulation Scheme will support households to reduce their bills in the context of unprecedented energy price rises.
4. The ECO2/2t/3 evaluation provided the first insights into the characteristics of households in receipt of the scheme. Yet it did not explore the impacts of the scheme in depth. This gap is being met via the ECO4 evaluation which uses theory-based methods to build a robust understanding of how, and in what circumstances, ECO4 generates outcomes for households.
5. Recognising the significant and expanding body of evidence now available on the impact of ECO on households, the GB Insulation Scheme M&E approach prioritises monitoring of household-level outcomes using existing administrative data. These data will allow us to differentiate household-level outcomes and impacts of the GB Insulation Scheme, from those of other parallel schemes (e.g. ECO4). The commissioned evaluation will focus to a greater extent on non-household stakeholders, although it will still include a household survey. It will fill some of the gaps in ECO4 by focusing on issues specific to non-household stakeholders in the GB Insulation Scheme, such as the costs of installation, and the ability of the supply chain to scale up. Alongside this, it will adopt a focused approach to scheme evaluation based on deep dives into specific topics of interest to policy and analytical colleagues. This will allow for more policy-relevant learning, whilst contributing towards wider generation of knowledge around thematic issues of relevance outside of individual schemes. The exact content of these deep dives is yet to be determined, however it is likely that we will use them to delve further into the impacts of the GB Insulation Scheme on the energy efficiency supply chain,

⁹²

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003872/eco-wave-1-summary-report.pdf

⁹³ 40% of beneficiary households had a pre-tax income of less than £16,000, compared with the national median income of £29,600 in the FY ending 2019.

and understand any distinctive issues and impacts of the scheme, relative to ECO4, among these stakeholders. This thematic evidence will be used by the Buildings Energy Evaluation Team to strengthen our knowledge of portfolio-level issues of relevance to the wider directorate.

6. Table 30 summarises the ways in which the core objectives of the GB Insulation Scheme will be monitored and evaluated. It shows the overlap between the key strategic objectives and the VFM appraisal metrics. It then sets out how each of these will be measured via the M&E.

Table 30: Links between strategic objectives, VFM metrics and measurement

Strategic Objective from Theory of Change	VfM appraisal metric	Measurement
Reduced energy bills, increased household resilience to cost of living	Modelled average annual household bills savings	Official Statistics will track estimated lifetime bills savings as a result of the GB Insulation Scheme Evaluation will verify this via household surveys and interviews
Progress towards Net Zero and GHG emissions reductions	MtCO2e non-traded carbon savings	Official Statistics track lifetime carbon savings. Evaluation will look at household heating behaviours and changes resulting from the scheme
Support jobs growth in energy efficiency sector	Estimated number of jobs supported	Evaluation will explore the links between the GB Insulation Scheme and jobs growth in the energy efficiency sector.

7. Under ECO4, monitoring of participation and work covered by the scheme is undertaken by the scheme administrator (Ofgem). Energy suppliers provide Ofgem with data on the number of installations completed. Ofgem then provide monthly data to the Department for Energy Security and Net Zero (DESNZ) on measures installed which DESNZ publishes as Official Statistics. This will continue under the GB Insulation Scheme.
8. As measures installed under the GB Insulation Scheme will be included in the ECO database, these will be linked with energy consumption data in the National Energy Efficiency Data-Framework (NEED) and published as a report on gov.uk, providing further evidence of the energy bills savings for those receiving installations. Reports using NEED will continue to be published annually on gov.uk.

9. Subject to internal resourcing, we will explore the option of using the TrustMark lodgement registry to acquire further information on the measures which households have had installed. This data provides the highest level of detail on measures installed and, in the longer term, will allow DESNZ to capture installer and installation data in a consistent way across schemes. Detail on both the NEED and TrustMark datasets is provided at the end of this annex in Table 32.
10. The commissioned evaluation will focus on answering questions which test assumptions and possible challenges highlighted in this IA. Possible evaluation questions for household and non-household stakeholders are set out in Table 31.

Table 31: Possible Evaluation Questions

Stakeholder Group	Question
Household	<p>How, if at all, has your household benefited from the scheme?</p> <p>Were you willing to contribute to measures? If so, how much?</p> <p>What were your preferred measures and how did this affect your willingness to contribute?</p>
Non-household	<p>Did richer households make up a larger share of households supported given higher contributions and less associated costs for suppliers?</p> <p>What were the costs of delivering loft and cavity wall insulation?</p> <p>Have suppliers been able to expand to meet demand?</p> <p>What impact did other schemes have on the ability of the supply chain to scale up to deliver measures?</p> <p>Have suppliers delivered measures in the most cost-effective way?</p>

11. The GB Insulation Scheme evaluation will employ a mixture of quantitative and qualitative research methods to gather data from household and non-household stakeholders. This is likely to involve:
- a. Surveys of a representative sample of participating households after GB Insulation Scheme measures have been delivered. This will provide a picture of the extent of scheme coverage, household delivery experience, and initial outcomes. The survey will address consumer-focussed evaluation questions, such as how households benefitted from the scheme, and whether they would have further measures installed. The survey will aim to recruit a mixture of households from the low income and general groups.
 - b. Follow up qualitative research with a sub-sample of the surveyed households. It is expected that this will be via interviews, which will explore the survey findings in

greater depth, as well as provide detailed evidence in relation to key evaluation questions.

- c. We will also gather views from a sample of non-household stakeholders. These will include installers and suppliers, and may also include managing agents, Ofgem, energy company representatives and Local Authorities. Research with these non-household groups may consist of in-depth interviews, focus groups and/or surveys.

12. In addition, we plan to do focused evaluation on specific topics of interest to policy and analytical colleagues and explore these via ‘deep dives’. The methodological approach to these case studies is yet to be determined and will depend on the topics of interest. Nonetheless, these case studies will explore topics to a sufficient level of depth and rigour to be able to draw robust conclusions.

13. For both household and non-household elements of the evaluation, we will consider the scale of resource which should be dedicated, and the volumes of surveys/interviews required, in the detailed planning stage. We will review this alongside the planned approach to the ECO4 evaluation. To avoid replication and minimise respondent burden, we will ensure these elements focus on the distinctive elements of the GB Insulation Scheme, over ECO4, and will determine a proportionate data collection strategy on this basis. Table 32 below summarises the proposed data sources used in the M&E plan for the GB Insulation Scheme.

14. The evaluation is expected to be commissioned in autumn 2023, with evaluation activity beginning later in 2023/early 2024. Household fieldwork will most likely begin in winter 2023/24 and the evaluation will continue until the end of the scheme (March 2026).

Table 32: Summary of all Possible Data Sources in the GB Insulation Scheme M&E Plan

Data source	Description/Variables	Timings	Potential usage in M&E
DESNZ Published Official Statistics	Based on data provided by Ofgem to DESNZ. Includes the following variables: <ul style="list-style-type: none"> • Approved ECO measures by category • Measure installation date • Measure delivery status by company • Installation address • Building information including floor area, property type, tenure. 	Monthly updates on measures installed and estimated bills savings. Quarterly updates on other indicators (e.g. carbon savings).	Official Statistics will be published as part of regular reporting. These data will be linked with information on gas and electricity consumption and published as NEED (see below). GB Insulation Scheme administrative data will be shared with the evaluation contractor to use as a framework from which to sample households.

<p>Domestic National Energy Efficiency Data-Framework (NEED)</p>	<p>The data framework matches gas and electricity consumption data, collected for DESNZ sub-national energy consumption statistics, with information on energy efficiency measures installed in homes, from ECO, amongst other schemes.</p> <p>Variables include:</p> <ul style="list-style-type: none"> • Gas and electricity consumption • Energy efficiency measures installed • Property attributes • Household characteristics 	<p>A summary of analysis is published annually.</p> <p>There is a lag with consumption data. The most up to date data are from 2020.</p>	<p>Published reports show the relationship at an aggregate level between ECO installations and energy consumption.</p>
<p>Survey data with GB Insulation Scheme beneficiaries</p>	<p>The commissioned evaluation will collect survey data from GB Insulation Scheme beneficiaries. This survey data will be based on a representative sample of households and will involve a range of variables including:</p> <ul style="list-style-type: none"> • Property type • Household type and composition • Socio-demographic characteristics • Measures installed under the GB Insulation Scheme • Attitudes and experiences of installations 	<p>Surveys will be timed to maximise the quality of responses.</p> <p>Households will be interviewed soon after installations, but within the winter season, to minimise recall bias.</p>	<p>The survey will be used to understand household reactions to GB Insulation Scheme installations and perceived impacts on energy usage, bills and thermal comfort.</p>