UK Government

RAF002/2425: Domestic Energy Affordability Support

Impact and Economic Evaluation
Annex A: Technical report

November 2025

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Annex 1. Introduction and overview of methods

This report sets out the methods applied during this impact and economic evaluation. It sits alongside a detailed report on the modelling conducted as part of the evaluation (Annex B).

1.1. Overview of methods used

This impact and economic evaluation combined theory-based and modelling approaches to assess the impacts of the energy affordability schemes. It draws on evidence from the surveys, research and analysis in the published interim evaluations for Great Britain and Northern Ireland[1] [2]. This evaluation also included new analysis to understand the impacts and value for money of the schemes. The new research and analysis carried out for this impact and economic evaluation comprised:

1.1.1. Theory of Change development and application of Contribution Analysis

The Theory of Change for the energy affordability schemes was developed at the outset of the interim evaluations and updated twice as part of this evaluation (at the close of the interim evaluations and as part of the design of this impact evaluation to delimit the causal pathways in scope of the impact evaluation).

The impact evaluation uses Contribution Analysis to assess and synthesise the findings from several analytical strands including household expenditure and energy consumption modelling, the University College London (UCL) Health Impact of Domestic Energy Efficiency Model (HIDEEM) health model, and the published findings from the Interim Evaluations. See Annex A2.

1.1.2. Econometric demand modelling of energy and non-energy consumption

To assess the impacts of the schemes, econometric models were used to estimate how the energy affordability schemes affected energy and non-energy consumption during the intervention period, to produce a counterfactual analysis of outcomes if the schemes had not been in place. This was achieved by estimating price and income elasticities of demand using econometric demand models, in particular using the almost ideal demand system (AIDS)[3]. Two approaches were used for the analysis of energy consumption. The first approach used a combination of data collected during the audit of EPG and the National Energy Efficiency Data-Framework (NEED) dataset, which were linked using energy meter numbers as unique identifiers, and estimated demand, as well as price and income elasticities. The second

[1] DESNZ, 2025. Domestic energy affordability support schemes in Great Britain: interim evaluation.
[2] DESNZ, 2025. Domestic energy affordability support schemes in Northern Ireland: interim evaluation.
[3] Eales, James S., and Unnevehr, Laurian J. (1994) "The inverse almost ideal demand system." European Economic Review 38.1: 101-115.

approach used the Living Costs and Food Survey (LCFS) and used structural demand models such as Linear Expenditure System (LES) and Quadratic Almost Ideal Demand System (QUAIDS), which estimated a system of consumer demand functions for all expenditure categories/commodity types.

For non-energy consumption, microdata from the LCFS was used to observe actual spend at the UK-level by gas, electricity, and oil-heating households, and this was compared to the counterfactual model, based on the calculated income and price elasticities. Descriptive analysis of household debt and borrowing was undertaken on the Financial Lives Survey and ONS Family Resources Survey.

Detailed findings and methods are presented in Annexes B1 and B2.

1.1.3. Estimation of the impact and benefits of the schemes on health and wellbeing outcomes

The evaluation used the University College London (UCL) Health Impact of Domestic Energy Efficiency Model (HIDEEM) to measure the health outcomes from the schemes. This model estimates changes in indoor conditions due to energy efficiency or expenditure changes and translates these into health impacts based on the probability of death for each age and modelled changes in disease prevalence and mortality using Quality Adjusted Life Years (QALYs).[4] A QALY is a measure of the value of a year of life, adjusted for quality of life; one QALY is equal to one year of life in perfect health.

Detailed findings and methods are presented in Annex B4.

1.1.4. Value for money assessment

The economic evaluation included a Social Cost Benefit Analysis (SCBA) conducted alongside a wider value for money assessment using the 4Es framework (economy, efficiency, effectiveness and equity).

Methods are presented in Annex A3.

1.1.5. Re-analysis of the surveys and qualitative research from the interim evaluations

The interim evaluations for GB and NI included surveys and qualitative evidence on which this evaluation has drawn. Both evaluations included two waves of nationally representative surveys. In the GB evaluation questions were included on two waves of Ipsos' KnowledgePanel survey, a nationally representative, random probability online panel survey. Both evaluations also included additional alternative schemes surveys. These additional surveys were needed to boost responses due the lower incidence of the AFP, and AFP AF populations in the GB general population and for EBSS AF in the UK population. In GB, a separate non-representative survey was conducted among successful applicants to EBSS AF

[4] Hamilton, Ian, et al. (2015) "Health effects of home energy efficiency interventions in England: a modelling study." BMJ open 5.4: e007298.

and AFP AF, and those eligible for AFP (based on their postcode). For the evaluation of schemes in NI, the survey designs were similar to those in GB, with two waves of a push-to-web survey of the general population and a supplementary survey of EBSS AF households.

Additionally, the interim evaluations included qualitative research with households, experts in vulnerable groups (including advocacy organisations and charities) and key stakeholders, referred to within this evaluation.

Further details on the methods used in the interim evaluations are presented alongside each interim report.

1.1.6. Literature review on the health and wellbeing impacts from household underheating

This literature review supported the quantification of health benefits. See Annex B4.

1.1.7. Qualitative research with energy suppliers and other stakeholders

These stakeholders had been involved in developing and delivering the energy affordability schemes in the UK. This research allowed for further evidence to be gathered on the effectiveness of delivery (in addition to that in the interim evaluations) as well as further evidence on the costs to suppliers for delivering relevant schemes to feed into the value for money assessment. See Annex A4 for further details.

1.2. Scoping of the impact and economic evaluation

Initial scoping work for the impact evaluation was conducted under the GB and NI interim evaluations which informed the methods which were used in this evaluation. At the start of this project an evaluation plan was developed which refined the evaluation questions and established how the evaluation would address these. Further development of the modelling methodology was undertaken through a series of workshops with DESNZ where initial modelling was presented and assumptions and data were assessed.

1.2.1. Rationale for the final evaluation design

The universal nature of the domestic energy affordability schemes (with all UK households being eligible) meant that it was not possible to empirically define or artificially construct a control group from statistical comparators. Instead, evidence of a no intervention scenario was derived from (a) modelling the price elasticities of demand for energy and non-energy goods and services, (b) an analysis of trends immediately prior to the introduction of the schemes, and/or (c) the statements of consumers, experts and key stakeholders about what they believe would have happened based on lived experiences and expertise.

1.3. Evaluation Framework

1.3.1. Evaluation aims

The aims of the impact evaluation were to:

- Apply and build upon the theory-based approaches used in the interim evaluations to understand the schemes' contributions to outcomes related to energy and household energy behaviours, fuel poverty, health and wellbeing, household spending, energy debt and the wider economy, and to energy supplier solvency, as well as to understand how (i.e. through what causal pathways) the schemes may or may not have contributed to observed results.
- Develop quantitative assessments of the schemes' impacts and determine whether and to what extent impact differs for different population groups where feasible, while also summarising findings at the level of the individual schemes where possible.

The aims of the economic evaluation were to:

- Analyse the relevant costs and benefits of the schemes (including the social and Exchequer costs and benefits of the schemes), compared to a 'no intervention' counterfactual scenario (Annex A3).
- Provide an assessment of the extent to which the individual schemes have delivered value for money.

1.3.2. Evaluation Questions

Development of the evaluation plan at the start of the project included revising the initial evaluation questions from the start of the study. These were the final impact and economic evaluation questions addressed by this project:

Impact evaluation questions

Table 1.1 List of outcome related impact evaluation questions

Evaluation Question	Sub-question
To what extent have the domestic schemes…	
1. Limited reductions in households' energy consumption compared to a 'no intervention' scenario?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes? • How, if at all, do the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)? • What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?
2. Limited reductions in households' non-energy spending compared to a 'no intervention' scenario?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes (or how large were the schemes' effects)? • How, if at all, does the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)? • What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?
3. Limiting the breadth and depth of fuel poverty compared to a 'no intervention' scenario?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes (or how large were the schemes' effects)? • How, if at all, does the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)?

	• What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?
4. Limited health disbenefits associated with households' underconsumption of energy compared to a 'no intervention' scenario?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes (or how large were the schemes' effects)? • How, if at all, does the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)? • What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?
5. Limited household borrowing compared to a 'no intervention' scenario?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes (or how large were the schemes' effects)? • How, if at all, does the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)? • What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?
6. Maintained the stability of the UK energy market and limiting energy supplier insolvency risks?	• Does the evidence align with the ToCs hypothesis about the schemes' contributions to changes in outcomes (or their anticipated impacts)? • To what extent did the schemes contribute to changes in outcomes (or how large were the schemes' effects)? • How, if at all, does the schemes' impacts vary by stakeholder or beneficiary groups (including across different schemes)? • What is the risk of bias associated with the evidence (i.e. level of confidence or potential for other explanations for the findings)?

Economic evaluation questions:

Table 1.2 List of economic evaluation questions

Evaluation Question	Sub-question
1. What are the schemes' social costs?	• What costs have been incurred in the delivery/ implementation of these schemes by delivery partners? • Were the administrative costs proportionate to the size of intervention? • What costs have been incurred by applicants and beneficiaries? • What was the environmental impact of the schemes as a result of potential increased energy consumption (compared to no intervention)?
2. What are the schemes' social benefits?	• What is societal value of the benefits associated with the outcomes of the schemes compared to a counterfactual scenario of 'no intervention'? • What is the net present value of the schemes according to a Social Cost Benefit Analysis? • What are the distributional benefits of the schemes according to income? How does that affect the net benefits of the scheme? • Were there any substitution or displacement effects of the schemes? If so, what was the impact of this and on who? • To what extent was there deadweight associated with the schemes? • Have the schemes achieved Value for Money according to the 4Es? And how does this vary by scheme? • To what extent did the universal support model of the schemes offer VfM in relation to key alternative approaches considered?
3. What are the schemes' broader economic impacts?	• What is the exchequer impact of the schemes? • What are the growth and inflation impacts of the schemes?

1.4. Methodological limitations

1.4.1. Limitations of the modelling

Elasticity Modelling

Throughout this report, the econometric counterfactual demand predictions have the limitation of not expressly modelling causal effects, but rather correlation. In spite of this limitation, the evidence, and subsequent predictions of these models, are well established in the scientific literature.

Predictive models

The evaluation relies on predictive models that necessarily impose assumptions to simplify complex consumer behaviour. Energy demand models rely on elasticities estimated over historical ranges and assume a stable, smooth relationship between price/income and consumption. When the policy shock is unusually large or the context changes, those relationships may not hold, and model predictions can become less accurate. To avoid these limitations we used flexible functional forms (log-log), tested minimum consumption floors, ran sensitivity analyses (e.g., treating EBSS as a price vs income effect), and disaggregated by fuel and income where feasible. We triangulated modelled results with survey evidence. Nonetheless, residual risk remains. Results should be interpreted as plausible ranges for direction and order of magnitude, not exact point estimates—especially for groups with limited data (some NI and alternative-fuel households) or under extreme price conditions.

Nonetheless, the modelling assumptions—such as the relative inelasticity of household energy demand—are grounded in established literature on energy consumption in relation to price changes and calibrated to reflect best practice, to minimise this limitation as much as possible.

Price elasticity of demand captures how sensitive consumption is to small changes in price, and may not reliably predict behaviour under large price shifts, such as those seen during the energy price crisis. To address this, the modelling uses log-log functional forms, which allow for curvature in the relationship between price and quantity consumed. However, even with this adjustment, the model may still overestimate reductions in consumption at very high price levels. For essential goods like energy, demand tends to flatten as prices rise, since households maintain a minimum acceptable level of consumption—particularly those not experiencing fuel poverty. In order to mitigate this limitation sensitivity analysis was conducted including testing different assumptions about the relationship and imposing minimum consumption levels. This is described in more detail in the modelling Annex B.

Treatment of EBSS as Income Support

In the modelling, EBSS was treated as an income effect, representing households being £400 better off over six months. In contrast, the EPG was modelled as a price effect, reflecting a reduction in the per-unit cost of energy.

EBSS was modelled as an income effect, based on the principle that income is fungible: regardless of the payment mechanism, households effectively had £400 more to spend over six months, which could be allocated to energy or other goods and services. However, there is a plausible argument that EBSS could instead be treated as a price effect since most households received it as a direct discount on their energy bills. To explore this alternative interpretation—where the discount may have been perceived as a change in energy prices rather than a cash transfer—a sensitivity analysis was conducted and is presented in Annex B7.

This alternative specification should be interpreted with caution. There is limited conceptual support in the literature for treating EBSS as a price effect, even though most households received the support via their energy accounts.

Extrapolation of HIDEEM to the UK as a whole

The HIDEEM model was designed specifically for England, it has been extrapolated to the whole of the UK by calculating per person values for England for morbidity, mortality and resource cost savings and aggregating this up to an estimated total population figure for the UK. This may introduce some uncertainty and error due to regional differences in demographics and climate, particularly in underlying health profiles and variation in outdoor temperature.

1.4.2. Data Coverage and Quality

The primary dataset used for the modelling was the Combined Audit and NEED dataset, as outlined in the methodology section. While this data set was extensive and provided overall good coverage of GB households using mains gas or electricity for heating there were some gaps in coverage and limitations discussed below:

Missing Supplier Data from Audit Data

The audit dataset did not include data from all suppliers, notably missing data from one of the largest suppliers. Some checks were performed to assess the similarity of the available data to the overall population and the dataset was broadly representative of households in terms of the known socio demographic characteristics. However, the absence of certain suppliers may have led to over- or underrepresentation of specific household types. In particular, households on time-of-use tariffs may be underrepresented. See Section 1.2 in Annex B for a full discussion of representativeness.

No identifier for Main Heating Fuel

The Combined audit and NEED dataset does not include identifiers for gas or electricity heating households. Households main heating fuel was inferred using a combination of the presence or absence of a gas meter and a minimum proportion of gas or electricity usage from their overall energy consumption. This may have resulted in the misclassification of some households with mixed fuel usage. More detail on how this was conducted is available in Annex B.

Income Data in NEED is modelled

The income data used to divide households into income deciles for subgroup analysis is sourced from NEED. This data is modelled rather than directly observed or reported, meaning it provides only an indicative estimate of household income. As a result, there is likely to be some inaccuracy in how households are assigned to income groups, which may affect the validity of subgroup comparisons. However, more robust income data is not available.

No coverage of Households in Northern Ireland or Off-Grid Households in the Combined NEED and Audit Dataset

The EPG Audit data has notable gaps: it excludes households in Northern Ireland (NI) and off-grid households using alternative fuels for heating.

Use of the LCFS

To help address these gaps, analysis was also conducted of data from the Living Costs and Food Survey (LCFS)—a large, nationally representative survey. This enabled analysis of energy consumption in NI, oil-heated households, and non-energy expenditure. However, LCFS also has limitations:

It provides expenditure data, not direct energy consumption figures. Consumption was estimated using ONS energy price statistics across the relevant period.

The data is self-reported via a diary method, which may be subject to respondent error.

While the overall LCFS sample is large (approximately five thousand households per year), some subgroup sample sizes were low for a small subset of the population. This includes:

- Households using alternative fuels other than oil as their main heating source. Therefore, results are extrapolated from the oil analysis, which may lead to inaccuracies and potentially overestimates of benefits to these households.
- Sample sizes of NI households in the LCFS dataset are too low for electricity and oil-heated households to explore differences in spending on energy and non-energy goods and services.

1.4.3. Limitations to Evaluation Survey Data

The survey data may have been subject to recall error as respondents were asked to respond about behaviours which happened several months before. The surveys for the interim evaluations were conducted in summer 2023 (GB) autumn 2023 (NI) while the main schemes ended in March 2023. This gap between the intervention and data collection may have affected the validity of the responses due to inaccurate or incomplete recall.

The GB and NI evaluation reports set out in further detail the limitations of the nationally representative and ‘alternative schemes’ surveys.

1.4.4. Indoor Temperature Data

Indoor household temperature data was not collected for this evaluation, so there is no direct observational evidence of whether households were underheating. As a result, the price elasticity modelling relied on energy consumption data. While it is reasonable to assume a strong link between energy consumption and heating behaviour, this approach leaves a gap in the causal chain between households receiving support through the schemes and any mitigation of potential increases in underheating.

Specifically, the price elasticity modelling compares observed energy consumption to a counterfactual, which provides an indirect indication of behavioural change. However, it does not directly capture the specific behavioural responses—such as heating practices—required to confirm that the schemes led to improved heating outcomes. This has implications for the contribution story about households being able to heat their homes to a comfortable level, and for understanding the links between this and household perceptions of 'comfortable versus uncomfortable levels of heating.'

The absence of indoor temperature data makes it more difficult to interpret energy consumption behaviour across income levels. Higher income households typically spend more on energy, giving them a greater 'distance to travel' in terms of potential reductions in consumption under a no-intervention counterfactual. As a result, they may appear to reduce their energy use more than lower income households in the absence of support, leading to the suggestion that the energy affordability schemes had a greater impact among higher income groups in avoiding reductions in consumption.

However, this interpretation may be misleading. Lower income households are more likely to be operating closer to a minimum threshold of energy use — a 'floor' below which further reductions would compromise basic needs. Their limited ability to reduce consumption means that the schemes may appear less effective for these groups, even though they are more likely to experience underheating without support. The Energy Price Guarantee (EPG), which provides greater support to high energy users, may also contribute to this apparent disparity.

Importantly, without indoor temperature data, it is not possible to observe whether households — particularly those on lower incomes — were able to heat their homes to comfortable levels. Some self-reported survey evidence was collected on this however it was not linked to the administrative data.

This gap also complicates conclusions about policy deadweight. Deadweight can arise when a policy disproportionately benefits groups that would have achieved the intended outcomes without intervention. In this case, higher income households may have maintained comfortable heating levels regardless of support, suggesting that the schemes may have subsidised consumption that would have occurred anyway. However, without indoor temperature data, it is not possible to confirm whether these households were heating beyond what was strictly necessary, or simply maintaining adequate comfort. This limits the ability to assess whether the support may have constituted deadweight or was justified in ensuring equitable outcomes.

The lack of a direct link between energy consumption in the administrative data and indoor temperature for this evaluation has been discussed above. Note that the administrative data is separate to the health outcome (HIDEEM) modelling. HIDEEM includes calculations of the relationship between energy consumption and indoor temperature, using indoor temperature surveys conducted previously for the English Housing Survey. In addition, the HIDEEM model cannot be directly linked to the counterfactual modelling of the administrative data, since they are based on different input data (the energy demand modelling is based on observed income and price elasticities with energy consumption, while the HIDEEM model is based on the value of energy 'subsidies' as an input to its model).

1.4.5. Limitations to the Impact and Economic Analysis

Potential double counting between impacts

There may be some double counting between the consumer surplus generated by energy price and income support measures, and the estimated health impacts. However, the distributionally weighted consumer surplus differential associated with energy affordability captures only a part of the broader health and wellbeing benefits of these schemes. While some overlap may exist — particularly in relation to avoided underconsumption and fuel poverty — the extent of this double counting cannot be quantified. It is assumed that the health and wellbeing impacts are additional to, and exceed, the consumer surplus from more affordable energy.

Potential over-estimation of impacts and economic benefits for some alternative fuel households. The impacts and economic benefits estimated in this evaluation may over-estimate the total effects of the schemes. They are based on predictive models, which produce the most reliable consumption predictions for households who receive their energy via mains gas and electricity; a cross-validation using ONS nationally representative data including predictions for oil-heated homes and in NI that heat with oil was also conducted. Separate models of other alternative fuels were checked but could not be included in the analysis due to small sample sizes. These homes' consumption levels and the impact of the schemes are extrapolated from the oil analysis. For aggregation, results for oil are aggregated to the total number of oil households in the UK based on national census data (2021 for England, Wales and NI, 2022 for Scotland[5,6,7]), and the oil results are used for other forms of heating, which is also captured in the national census data. This ensures that the aggregated results gross up to the overall impact estimates and include the very small numbers who received EBSS AF and AFP. Nonetheless such estimation may lead to inaccuracies and potentially overestimates of benefits to these households.

Potential double counting between the domestic and non-domestic schemes

The assessment of double counting risk between the domestic and non-domestic schemes is considered to be low. Firstly, the two evaluations cover different types of benefits; this evaluation considers the welfare effects of lower consumer energy prices and health and wellbeing through avoided underheating, whereas the non-domestic evaluation considers the

[5] Census - Office for National Statistics
[6] Census 2021 | Northern Ireland Statistics and Research Agency
[7] https://www.scotlandscensus.gov.uk/about/2022-census/

direct impact on businesses, public and voluntary sector organisations. Secondly, the modelling in this evaluation mainly uses energy meters, for which the vast majority are in different locations to organisations. Thirdly, the non-domestic evaluation mainly assesses benefits using input-output modelling, which measured impacts at a whole economy level. There may be some small risk of double counting if the non-domestic schemes led to lower prices, which increased consumer surplus in the domestic population. However, that would be a small part of the overall inflationary effects, which were out of scope in both evaluations. In cases where people live in the place they work, then it may be possible that they could have received direct benefits of both the domestic and non-domestic support on their ability to heat their residence. However, checks were built into the delivery of schemes to minimise this risk and in any case this would represent a small proportion of the population, and does not introduce significant double counting risk.

Limited assessment of the macroeconomic impacts of the schemes

This evaluation was not able to conduct a quantitative analysis of inflation or growth effects from the schemes. This would have required the development of a fully detailed macro model which was not possible within the scope or timescale of this project. Quantification of growth effects would be subject to significant levels of uncertainty at the macro level, leading to potentially spurious results. Therefore, a more limited qualitative contextual analysis was included for the contribution claim in Section 4.3 and this was nested within the broader contribution claim on non-energy spending.

Disaggregation of the impact of individual schemes

While efforts were made to quantify the contribution to the impact by major schemes on key contribution claims, it was not possible to do so across all schemes or for all claims. Where estimates of individual scheme contributions are presented, they are limited to the highest-cost schemes to HM Treasury (EPG and EBSS). These estimates rely on differences in modelling approaches and assumptions about scheme-specific effects, which are discussed in more detail below. As such, they should be interpreted with caution.

Disaggregation of Scheme Costs and Benefits

Disaggregation of the costs and benefits of EPG which is the largest value scheme has been attempted for this evaluation however it was not possible to disaggregate some of the administrative costs accurately. Additionally, it was not possible to disaggregate all of the benefits, specifically the health benefits because the effect of the input amount (the total level of financial support provided by the schemes) is not linearly associated with the outputs of the model. In other words, if the energy affordability schemes had been half the value that they were, the resultant health and wellbeing impacts would have been less than half the amounts estimated from the full scheme. Any attempt to separate out health and wellbeing impacts by scheme would have led to a significant under-estimate of the overall impact of the schemes and was not included in this evaluation.

Lack of supplier administrative cost data

The evaluations intended to obtain data on the costs incurred by energy suppliers to administer the schemes. These costs could include communication (internal and external), software/system development, customer service and complaints, financial processes, compliance and reporting. However, this evaluation was not able to obtain sufficiently detailed estimates of these administrative costs from enough suppliers to include in the CBA. During interviews and collection of cost data, low response rates and incomplete returns from suppliers affected the quality of the data received. However, from the limited evidence obtained, supplier administrative costs are expected to be insignificant compared to the overall CBA.

Annex 2. Application of theory-based evaluation methods

This section presents the theory-based evaluation methods developed for this evaluation and the use of Contribution Analysis to synthesise and assess the evidence from the impact evaluation.

2.1. Development of the combined UK-level theory of change

For the GB and NI interim evaluations of the domestic energy affordability schemes, separate scheme-level theories of change (ToCs) were developed (see also Section A2.2 for a summary of how Contribution Analysis was applied in the interim evaluations). For this UK-level impact evaluation, the GB and NI ToC diagrams were first merged into an overarching programme-level diagram. This diagram is presented in Figure 2.1.

As the impact evaluation developed, the scope was narrowed based upon the final evaluation framework agreed with DESNZ. The activities were narrowed down to only those intended to produce outputs expected to contribute to outcomes for households and energy suppliers, and inputs were removed for the purpose of simplification (and this ToC is focused on the impact evaluation of which analysis of inputs is not part).

This process resulted in the revised overarching Theory of Change for the UK schemes, illustrated in Figure 2.2 on the following page. The two ToC diagrams describe the overarching aims of the energy affordability schemes and how the interventions were intended to achieve these. The schemes were intended to limit several potentially harmful behaviours and outcomes for households in the face of significant price hikes in home energy over the winter 2022/23 period. These comprised additional underheating (potentially resulting in impacts for health) as a result of reduced energy consumption, underspending on essential goods, increased household borrowing on energy, and non-payment of energy bills (leading to increased energy debt and reduced cashflow for energy suppliers).

It is also important to recognise that the schemes could have resulted in undesired impacts. For instance, if the schemes enabled higher levels of energy consumption compared to the counterfactual, this would have impacts on the environment through higher greenhouse gas emissions compared to the counterfactual. In the energy markets, government support to maintain a more affordable maximum unit price could have meant that uncompetitive energy suppliers were protected.

Figure 2.1 Interim Theory of Change combining GB and NI theories

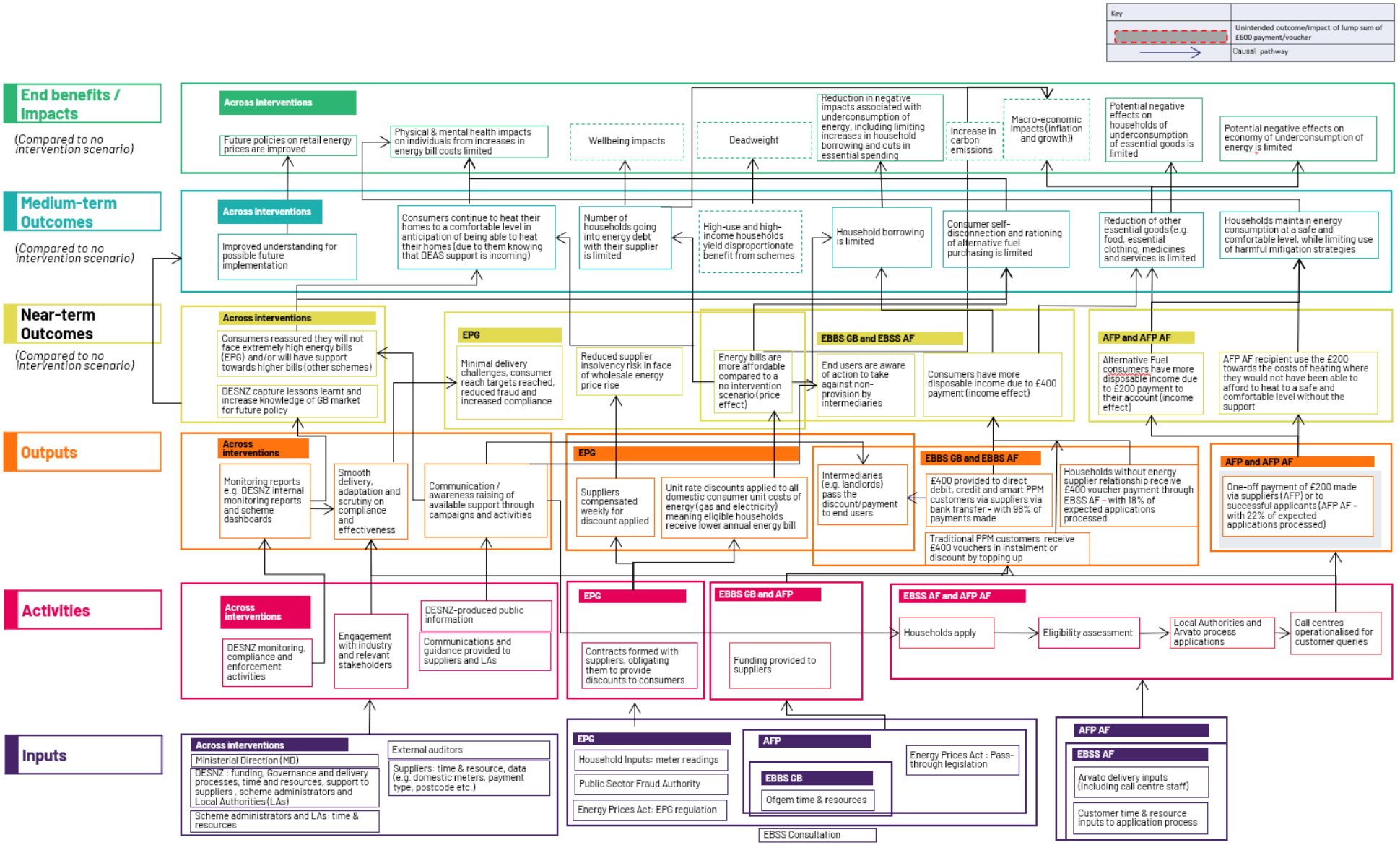
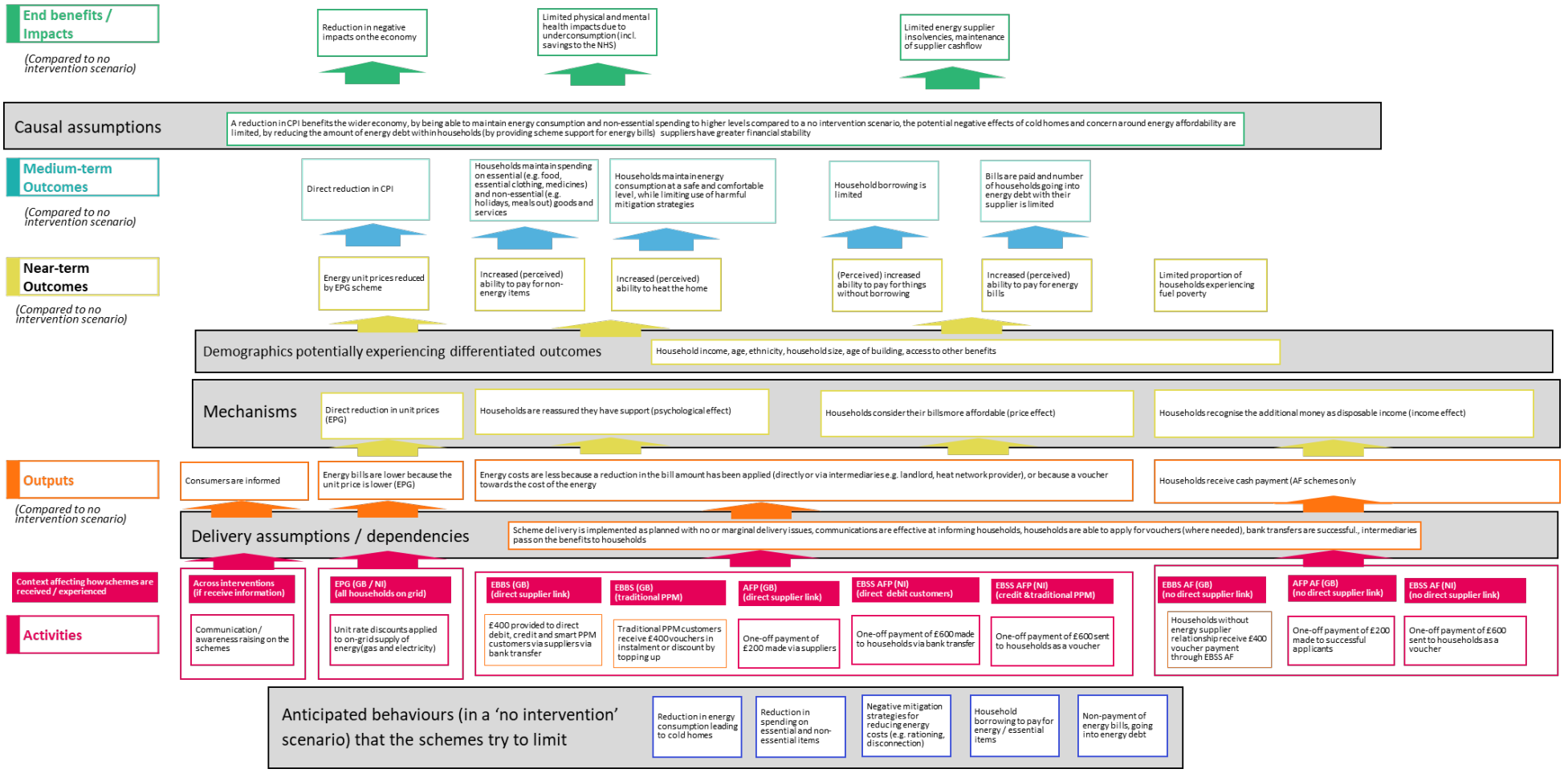


Figure 2.2 Revised overarching Theory of Change for the schemes



The following section summarises the key elements of the revised overarching ToC (Figure 2.2). It is important to note that the outcomes and impacts of the schemes are all compared to a counterfactual where no interventions were put in place. The schemes were not intended to reduce negative effects per se (e.g. fuel poverty) but rather prevent the worsening of these effects as a result of the increases in energy prices.

Activities

Activities included communications to households by DESNZ and its contractors, energy suppliers, local authorities, and regulators (Ofgem and UREGNI). These also involved the processes for delivering support to households (or intermediaries) via these same energy suppliers, contractors and stakeholders.

Outputs

Outputs directly flowed from the schemes' activities: it was intended that consumers were informed, energy prices were reduced or payments received by households.

Outcomes

The intended near-term outcomes of the schemes included that households would **perceive** that they had greater ability to pay for energy or for non-energy goods and services, including essentials and a reduced need for borrowing or debt. In turn, this would lead to medium-term outcomes, i.e., that reduced the likelihood of households experiencing the negative effects of energy price increases (compared to no intervention). Therefore, they would be able to maintain consumption of energy and non-energy goods and services, without resorting to additional borrowing or energy debt, reducing savings or underheating their homes.

Alongside these outcomes it was intended that the schemes would limit the proportion of households going into fuel poverty as a result of the energy crisis. By reducing the unit cost of energy, the EPG scheme was also anticipated to directly reduce the level of consumer price inflation (CPI).

End benefits/impacts

As a result of the schemes, three main impacts were identified. These included limiting: additional negative impacts on the wider economy following the energy price rises of 2022 (inflation and impacts on GDP growth); additional effects on health and wellbeing due to underheating (including in costs to the NHS); and by limiting energy debt energy supplier insolvencies and reduced short-term cashflow.

Mechanisms

As set out in the overarching ToC above, it was expected that, through communications, the public would become aware of the schemes and their anticipated benefits. It was expected that knowledge of the schemes would reassure households about the level of support available to them. This would lead to households perceiving their energy bills to be affordable, and

households perceiving themselves to have disposable income and making them less likely to underheat or undertake other negative mitigation strategies.

It was anticipated that this combination of schemes would mitigate risks to UK households linked to energy consumption / expenditure through the following mechanisms:

- **Direct reduction in unit prices**, reducing the amount that households needed to spend on energy and therefore encouraging maintenance of safe heating behaviours, limiting additional fuel poverty, energy debt and reducing inflation (CPI);
- **Increase in disposable income** through reduced energy bills or via bank transfer or vouchers, leading to maintenance of both energy and non-energy spending, and limiting increases in fuel poverty and debt;
- **Households are reassured they have support**, leading to maintaining or adopting intended behaviours for example maintaining heating at a safe level;
- **Households consider bills to be more affordable**, leading to maintaining or adopting intended behaviours such as maintaining spending on other essential goods and services or avoiding taking on additional debt.

In turn the schemes were intended to support supplier stability by:

- Providing a buffer against household energy debt by ensuring an additional flow of finance;
- Reducing the number of disconnections and reducing household energy debt.

2.2. Application of contribution analysis

This section provides details on the Contribution Analysis method used for assessing the schemes' contribution to key impacts identified in the Theories of Change.

The evaluation tests **six main contribution claims**[8] summarised in Table 2.1 below. In addition, a further contribution claim on the macro-economic outcomes of the schemes was added during the evaluation, which linked to the claim about household non-energy finances.

[8] A contribution claim is a causal hypothesis – i.e. a statement of how an intervention is expected to influence a particular type of change and any dependencies, assumptions or risks associated with the realisation of the intended effect. The term contribution claim comes from John Mayne's Contribution Analysis approach to impact evaluation which is discussed in this Annex.

Table 2.1 Contribution claims used within this evaluation

Theme	Contribution claim
Consumption	The schemes contribute to the ability of households to maintain energy consumption at a safe and comfortable level (compared to a no intervention scenario), while limiting the use of other harmful mitigation strategies
Fuel Poverty	The schemes contribute towards limiting the increase in the proportion of households experiencing fuel poverty (compared to a no intervention scenario).
Household finance and economy	The schemes limit increases in household borrowing, cuts in essential spending (e.g., food, essential clothing, medicines), and cuts in non-essential spending (e.g., holidays or meals out) and savings. Related to this contribution claim is a secondary claim on the macroeconomic impacts of the schemes: The contribution of the schemes to reducing energy prices and providing financial support to households leads to macroeconomic impacts, both on inflation and on GDP growth.
Health	The schemes limit negative mental and physical health impacts arising from increases in energy bill costs (including limiting instances of cold-related illnesses that can arise from under-heating).
Energy debt	The schemes contribute to limiting the number of households that would not be able to pay their energy bills and who go into energy debt with their supplier
Supplier impacts	The schemes help limit the risk of energy supplier insolvency and maintain the financial health of suppliers over the intervention period primarily by limiting energy debt and improving cashflow.

To test each contribution claim, the impact evaluation has involved the following analysis:

1. **A review of the programme theory underpinning each outcome area** – i.e. an analysis of the problem or risk that was identified by Government, and the rationale and logic underpinning how the schemes were expected to mitigate or address these problems / risks. This analysis largely drew upon the findings and evidence presented in the GB and NI energy affordability schemes, informed by scheme documentation (including available business cases) and interviews with DESNZ. Where available,

additional insight from the literature or discussions with DESNZ was reflected in this analysis.

Then, for each contribution claim, the impact evaluation has involved:

2. **A definition of the contribution claim being tested**, where relevant they have been refined based upon the conclusions and findings of the interim evaluations.[9]

3. **A definition and description of the change observed** in the outcome covered by the contribution claim (e.g. heating to safe/comfortable levels, energy debt levels, supplier solvency), where evidence of this change comes from a synthesis of the findings from all relevant analysis strands and data sources. Here, the evaluation team took care to assess evidence of anticipated change not occurring or any observed change being less than the scheme had anticipated. It also considered unintended effects. The key challenge for observing change in the energy affordability schemes evaluations, is that the schemes aimed to prevent adverse effects from energy price rises – therefore the positive outcomes intended by the schemes was a 'less negative outcome' in all cases. This is more difficult to measure or prove, and the evaluation has adopted several methods – including modelling and asking households and other key stakeholders to estimate the 'no intervention scenario' - for drawing plausible conclusions on this (as discussed below).

4. **Analysis of the schemes' contribution to the observed change.** For this, the evaluation team considered all evidence indicating a causal link between the schemes and the change observed. This comprised: (1) evidence from modelling demonstrating relationships between household behaviours and energy consumption and spending and how this would change with the scheme's support as 'inputs'; (2) trend data in the outcome of interest indicating that the timing of the schemes aligned with the types of change the schemes were expected to achieve; (3) evidence from household surveys and qualitative depth interviews conducted and analysed for the published interim reports in which households or suppliers indicated that without the schemes they would have behaved differently (linked to the change observed); and (4) evidence from these same sources (i.e. the published interim evaluations) which indicated that the scheme support catalysed certain behaviours likely to contribute to the outcome (assessment of mechanisms, or causality).

5. **Assessment of the scale and nature of the contribution**. Here, the evaluation team reviewed whether the evidence of contribution differed for different groups of people – i.e. whether it worked better for some people than others and what other factors might have also contributed to the observed outcome. The team used this information to draw conclusions on the sufficiency and necessity of the schemes across different groups.

[9] As part of the analysis for this final evaluation, the findings from the interim evaluations were initially used to make some changes to the contribution claims. However, on discussion with DESNZ, it was agreed to retain the contribution claims in their original format, since the value of the analysis in the final evaluation was to further test these more robustly with additional evidence and a more systematic analysis of contribution (using the framework presented in this Annex). The main changes to the contribution claims from the interim evaluation, therefore, are some very minor changes in language to improve evaluability.

6. **Appraisal of the strength / robustness of the evidence base and associated conclusions.** To provide greater robustness to the findings, the teams then ran the analysis and conclusions through a series of tests of the plausibility and probability of contribution, given the evidence base (see discussion below). In addition, the team considered any limitations to the data and used the analysis from both the evidence tests and the appraisal of methodological limitations to draw conclusions on the strength of the conclusions drawn.

7. **Definition of the resultant contribution story.** Whilst the formulation and revision of the contribution story are key steps in Contribution Analysis, the format and content of the contribution story is not consistently or clearly defined in the literature. Mayne (2018) sets out considerations for formulating the contribution story ('step 4' of contribution analysis) implying that the story should consider the logic underpinning the theory of change and its validity, the evidence available to support or refute it and the strength of this evidence, the effects of other influencing factors and any weaknesses in the story or aspects of the theory of change that are not validated.[10] In their paper on how they have applied evaluation approaches akin to Contribution Analysis over five years of practice, Delahais and Toulemonde (2012) state that, for them, "Contribution stories are written as short texts (300–500 words), which are easily accessible to public managers".[11] Both of these sources therefore suggest that contribution stories should summarise the key components of analysis underpinning conclusions on the validity of the contribution claim. In this evaluation, the resultant contribution story for each claim provides information on: the extent to which the intended change occurred, whether the intervention contributed to this change, through what mechanisms the intervention likely contributed, whether the scale of outcome and/or contribution was different for different groups, and the strength of evidence supporting the contribution.

2.2.1. Application of contribution analysis in the interim evaluations

The interim evaluations of the Domestic Energy Affordability Schemes in GB and NI had an aim to gather initial evidence of the intended outcomes of the schemes and the schemes' contribution to these. They also involved process evaluations which assessed whether, and to what extent, the schemes were delivered as intended and whether this delivery and the scheme design was appropriate for the effects intended.

At the outset of the evaluations, through workshops with DESNZ, the evaluation teams developed detailed Theories of Change around how the schemes would achieve their outcomes and impacts, but also how they would mitigate against potential adverse effects such as gaming and fraud, administrative burden and costs to suppliers, potential barriers to access to households, and also how they would support onward learning and understanding for DESNZ. In this way, the Theories of Change provided a conceptual framework for both the process and early outcome / impact evaluations.

[10] Mayne (2018) Contribution analysis: An approach to exploring cause and effect. ILAC Brief 16, May 2018.
[11] Delahais, Thomas & Toulemonde, Jacques. (2012). Applying contribution analysis: Lessons from five years of practice. Evaluation. 18. 281-293. 10.1177/1356389012450810.

A key focus of the evaluations, however, was on understanding whether the schemes contributed to their ultimate aims of: (1) reducing the risk of underheating within homes that might lead to negative impacts on health and wellbeing (and potentially to a higher proportion of households facing fuel poverty); (2) limiting increases in household borrowing and cuts in other essential spending (e.g. food, essential clothing, medicines) and savings; and (3) limiting the number of households that would not be able to pay their energy bills and who go into energy debt with their suppliers. These pathways became the focus of the outcome evaluation component of the interim evaluations and through the workshops and through further review and refinement with DESNZ, the interim evaluation teams defined nine contribution claims for which evidence which would either support or refute the claim was collected.

Through the data collected, the interim evaluations were also able to assess whether and how the schemes affected different household groups differently. The data collected was also assessed for its strength against a bespoke 'evidence strength framework' which is described further in this Annex.

2.2.2. Contribution Analysis and theories of change for understanding causality

Two key challenges faced by the interim evaluations (which persist in this impact evaluation, although somewhat mitigated through the methodology for this evaluation) are:

1. **The challenge of measuring the 'change' which the schemes aimed to achieve**. This is because the schemes aimed to *prevent* harmful change which is more difficult to observe as one can only estimate the 'no intervention scenario' and the level of change that would have taken place. Given the universal nature of the scheme, there is no observable counterfactual against which to compare outcomes. Within the interim evaluations, a 'no intervention scenario' was estimated by applying assumptions formulated based upon sources of literature, by asking households and suppliers (i.e. those expected to benefit from the schemes) what they think would have happened without the schemes, and by inferring what might have happened on the basis of the behaviours that households reported in the surveys and interviews. This impact evaluation has advanced the evidence base by modelling key household behaviours targeted by the scheme, using available data. It draws conclusions about the extent of change by comparing observed outcomes with a counterfactual scenario — estimating what would likely have occurred in the absence of the scheme.

2. **The challenge of observing an influence of the scheme on household behaviours**. This is because the spending and energy consumption behaviours are affected by a multitude of factors, including individual circumstances which are challenging to enumerate and generalise across a survey (e.g. the number of devices in the home, how warm the household likes to keep the home, their views on climate change, their habits and personalities). While some factors are more readily measurable through surveys (e.g. income, household size, health status) or external data sources (e.g. weather patterns, economic conditions), they are inherently complex. This makes it challenging to control for these factors in the analysis. A further challenge for discerning the direct effects of the schemes on household behaviours was the reliance on self-

reported data. This approach is subject to recall error as respondents were asked to respond about behaviours which happened several months before. The surveys for the interim evaluations were conducted in summer 2023 (GB) autumn 2023 (NI) while the main schemes ended in March 2023. This gap between the intervention and data collection may have affected the validity of the responses due to inaccurate or incomplete recall.

These challenges make it difficult for the evaluator to confidently trace a causal pathway. Again, this impact evaluation has sought to improve the evidence base for contribution by (1) returning to the interim evaluation evidence and further interrogating it to understand for example whether variations in findings by group demonstrate further evidence of contribution; (2) utilising evidence from modelling to support a causal link; and (3) running the evidence of contribution through evidence tests to further build up a story of plausibility and probability.[12]

For this impact evaluation, the evaluation team has aimed to address these gaps in the evidence or in the *strength* or *volume* of the evidence set out under bullets 1 and 2 above by using additional techniques and analysing a wider range of quantitative datasets. These datasets were selected to represent as much of the population supported through the energy affordability schemes as possible. The evaluation team have also reviewed and returned to the evidence base for the interim evaluations to build up a more robust conclusion of the schemes' impacts. In this way, this impact evaluation follows the step-wise approach to building up evidence of contribution by iteratively assessing evidence of generative causation,[13] and also brings in statistical evidence from modelling.

2.2.3. Assessing the scale and nature of contribution

Since being first introduced as an evaluation methodology by John Mayne (2001), Contribution Analysis has been applied and adapted by different evaluators, leading to some differences in application and schools of thought as to what it can and cannot do. Whereas in its earlier applications, Contribution Analysis encouraged evaluators to consider what other factors might bring about the intended results and to test these as 'rival' or 'alternative' hypotheses, in later papers, Mayne has argued that instead evaluators should try and identify the 'causal package' leading to the observed change and assess how essential (or necessary) the intervention was as part of that package. This kind of investigation and assessment is, however, challenging for the energy affordability schemes for the reasons set out in the preceding subsection. As far as possible, this impact evaluation has tried to draw conclusions on the necessity of the schemes through the modelling (which has tested different scenarios for a likely effect on household energy consumption and spending) and by reviewing and triangulating survey responses to different questions in the interim surveys which tried to assess different household behaviours, and which also collected demographic data on these respondents. The evaluation has also, in

[12] See discussion below. Further, for more on how plausibility and probability should be evidenced see: Delahais, T., & Lacouette-Fougère, C. (2019). Try again. Fail again. Fail better. Analysis of the contribution of 65 evaluations to the modernisation of public action in France. Evaluation, 25(2), 131-148.
[13] As pioneered by Mayne, J. (2001). Addressing attribution through contribution analysis: Using performance measures sensibly. Canadian Journal of Program Evaluation, 16(1), 1–24.

the final stage of analysis, drawn upon realist evaluation thinking[14] to assessing causality by considering and testing with data the plausibility of different explanations for how the schemes trigger in different contexts mechanisms that lead to the intended outcomes.

2.2.4. Appraising the evidence base

For every contribution claim, the evidence base was assessed for the extent to which it demonstrated a plausible, probable or highly probable contribution. This drew upon data and analytical strand-specific assessments of the data strength (described in the next subsection).

Two well-cited frameworks for assessing the strength of causal inference in an impact evaluation are Colliers (2011) process tracing tests[15] and Delahais and Toulemonde's (2017) tests.[16] This evaluation has applied Delahais and Toulemonde (2017), given its clearer application to the intervention. However, the two frameworks have some overlap, as well as some nuances of difference, but each are based upon a premise that evidence can be classified for its strength (in proving / disproving a causal theory).

Using these frameworks, the strength of evidence around contribution is classified based upon whether it is necessary and/or sufficient for demonstrating a contribution. The tests proposed in each framework and their meaning are set out in Table 2.2 below. The tests which are weakest, when passed, at 'proving' a causal theory appear in the first rows, with the strongest test in the final row. The 'interpretation' column below provides a definition of the test which merges the definitions in Collier and in Delahais and Toulemonde. Collier's detailed explanation of how each test 'proves' or 'disproves' a causal theory (in a fictional murder case) provides further examples of the application of these terms, whereas Delahais' later paper with Lacouette-Fougère (2019)[17] provides some additional detail.

[14] Methods and techniques which are set out in detail in Pawson, R., & Tilley, N. (1997). Realistic evaluation. Sage Publications.
[15] Collier D. Understanding Process Tracing. PS: Political Science & Politics. 2011;44(4):823-830.
[16] Delahais, T. & J. Toulemonde (2017) Making rigorous causal claims in a real life context. Evaluation 2017, Vol. 23(4) 370–388.
[17] Delahais, T., & Lacouette-Fougère, C. (2019). Try again. Fail again. Fail better. Analysis of the contribution of 65 evaluations to the modernisation of public action in France. Evaluation, 25(2), 131-148.

Table 2.2 Comparison and further detail on Delahais and Toulemonde and Collier's tests

D&T's tests	Collier's tests	Interpretation	Necessity / sufficiency	Examples of such evidence
Consistent Chronology	Hoop Test	Evidence that the intervention happened before the observed effect (which might be taken for granted, but if not found to be the case disproves contribution). Here, contribution can only be said to be **possible**.	Necessary for contribution, but not sufficient as an evidence source	Timeline evidence that the intervention was received before the timeframe in which the effect was intended
No equivalent	Straw in the Wind	Evidence which appears to indicate contribution, but which could be also indicative of a coincidence or a correlation (rather than cause). Here, contribution can only be said to be **plausible**.	Neither necessary nor sufficient to indicate contribution	The views and perceptions of beneficiaries / stakeholders
Convergent triangulated sources	*No equivalent*	Properly triangulated sources are independent from one another in so far as they stem from stakeholders having different vested interests. Pieces of evidence originating from such sources are mutually reinforcing as far as they converge. Triangulated sources as credible, not so much because of the number of supporting sources, but rather because the sources are diverse, independent from one another, and fully supporting the contribution claim without any divergent piece of evidence. Such evidence makes the contribution **probable.**	Sufficient, but not necessary	A mix of sources (e.g. energy statistics, household reporting, and the views of experts) all indicate the same finding

Authoritative source	*No equivalent*	Evidence which has already passed a thorough test under the responsibility of credible authorities in so far as the point at issue is not in dispute among different authorities, thus contribution is **highly plausible or (highly) probable** (depending upon the credibility of the authority's tests).	Potentially sufficient to indicate contribution, but not necessary	Expert observations / perspectives, peer- reviewed articles, evidence reviews, widely-accepted truths or principles which commonly inform assumptions in the literature and business cases or (most strong) RCTs.
Signature	Smoking gun	Evidence of an effect that demonstrates a characteristic which only the intervention would be likely to produce. Here contribution is **highly probable**.	Sufficient, but not necessary	Observed behaviours aligned with intervention
No equivalent	Doubly decisive	Evidence – or a body of triangulated evidence - and logic which eliminates all other explanations. Here, contribution is **highly probable**.	Sufficient and necessary as an indicator of contribution	Fleshed-out and well-evidenced argumentation

For each contribution claim, the extent to which the evidence indicated that contribution was **possible (only), plausible, highly plausible, probable or highly probable** was assessed. Signature evidence provides the strongest evidence of contribution, followed by authoritative evidence (which has a high level of credibility) and then convergent triangulated sources. Where several sources of authoritative evidence *diverge* the strengths and weaknesses of these authoritative sources is discussed and a conclusion drawn on which is the most relevant to assessing the contribution claim and/or the implications for the validity of the claim – the convergent triangulated sources test is not passed – i.e. where sources did not agree these were considered to have failed the 'convergent triangulated sources' test.

In cases where the analysis focuses on a sub-group (e.g. where it excludes populations in receipt of support from the Alternative Funding schemes), the conclusions drawn on contribution are provided only for those groups within the analysis and this is stated as a limitation in the evidence base.

As part of the robust delivery of this evaluation, at the level of data and individual analytical strands, the limitations were also assessed and these are discussed in relevant sections of the annexes.

2.3. Assessing the strength of evidence for each contribution claim

Chapter 4 of the main evaluation report presents the evidence against each contribution claim and then summarises the claims of causality and the resultant contribution story. For each contribution claim, this evaluation assessed whether the claim was possible (only), plausible, highly plausible, probable or highly probable against the framework set out above. This assessment is presented in this section for each claim.

2.3.1. Household energy consumption

The contribution claim being tested was:

The schemes contribute to the ability of households to maintain energy consumption at a safe and comfortable level (compared to a no intervention scenario), while limiting the use of other harmful mitigation strategies

Assessing the strength of the contribution claim

First, applying the consistent chronology test, only those schemes launched before or early into winter 2022/23 (EPG, EBSS) were likely to have been able to influence heating behaviours in winter 2022/23, as the other schemes were launched towards the end of / after the winter. As EPG and EBSS reached the largest populations in both jurisdictions, and given their universal nature, it means that there was potential for the schemes to have had an important influence on heating behaviours for the majority of the population. For the schemes launched later (AFP launched in January 2023 and EBSS AF launched February 2023), it could be argued that households were aware of the incoming support and therefore felt able to heat

their homes to a comfortable temperature. However, the discussion of causality in Section 4.1.4 concludes that there is little evidence for the reassurance mechanism; therefore such an argument is speculative.

Next, applying the authoritative source test, in relation to the contribution of the schemes towards energy consumption, the literature on the price elasticity of demand is well-established and authoritative, which provides additional confidence that the energy demand modelling developed here is also authoritative. There is a necessary caveat that all the econometric counterfactual demand predictions have the limitation of not expressly modelling causality, but rather correlation. Predictive models necessarily impose restrictions and assumptions, and these have been carefully calibrated to align with best practice in the literature.[18] Therefore, the modelling, which indicates that EPG made a notable contribution to energy consumption behaviours and EBSS to a much lesser extent, can be considered as authoritative evidence of contribution.

The signature test:

- The modelling in the main report uses authoritative sources of information on the trade-offs in household purchasing behaviours to mimic the behaviour of the EPG and EBSS schemes on actual data on energy consumption for gas, electricity, and oil-heating households. However, this is based upon modelled predictions rather than actual observations of trends over time, which means that energy demand modelling cannot be considered a signature evidence source.
- The nationally representative surveys sought to collect evidence that would pass a signature test by first assessing respondents' awareness of and understanding of the schemes (to ensure they knew what they were being asked about), and then whether they considered that without the monetary support provided by the schemes (defined in terms of the monetary amount higher that their energy bills would have been in the counterfactual) they would have heated their homes in that way. Where respondents stated that 'without the schemes they would not have acted in this way', this could be considered that their behaviour is a signature of the schemes. However, the evidence of underheating is still self-reported, with a lag between the time period being recalled and the timing of the survey, meaning that the data may be subject to biases or inaccuracies – it is not as strong as observations of energy consumption for heating. Therefore, the Ipsos survey evidence collected from the interim evaluations cannot truly be considered a signature.

In applying the fourth test of convergent triangulated sources, the modelling and survey evidence from the interim evaluations combined indicate that there is a relationship between receiving the support, energy consumption behaviours, and maintaining home heating.

Overall, the evidence available indicates that it was **probable** that the schemes contributed to maintaining heating behaviours (compared to a no intervention scenario) particularly in

[18] Assumptions include the linear homogeneity in prices, for which there are strong priors in the literature and are tested empirically between different model specifications (see Annex B1).

households where the spending on energy represents a significant proportion of household spend or where high levels of energy are used in the household.[19] The evidence for the contribution of the schemes towards energy consumption is stronger – it is **highly probable** given the results of the modelling.

2.3.2. Fuel poverty

The contribution claim being tested was:

The schemes contribute towards limiting the increase in the proportion of households experiencing fuel poverty (compared to a no intervention scenario).

Assessing the strength of the contribution claim

First, applying the consistent chronology test, it was possible for all schemes to have an effect, given that energy burden is not time-bound. However, energy need increases during winter, and therefore the relevance and necessity of the schemes for mitigating the energy burden was around the time when bill-payers would have the largest outgoings on energy. This evaluation has not been able to pinpoint at what timepoints households pay for their energy, although this clearly differs depending upon the energy tariff, form of paying for energy, and the fuel type (as the evaluations have also found from national statistics and responses to the nationally representative household surveys conducted for the interim evaluations). It seems likely, however, that any schemes that came later would not have been able to mitigate the energy burden as effectively as if they had been introduced earlier.

Next, applying the authoritative source test, the modelling conducted has utilised an authoritative source of data on household spending (the LCSF) and the evidence presented passes the authoritative source test.

The evidence also passes the signature test. The process evaluations for the schemes in GB and NI showed that the schemes, together, reached a large majority of the households in both jurisdictions and that where they were received they unequivocally mitigated the energy price driver of energy burden (in the case of EPG) and the income driver (in the case of the other schemes).

The evidence passes the fourth test of convergent triangulated sources. The surveys conducted for the interim evaluation and the Living Costs and Food Survey (LCFS) analysis of household spending are independent sources which both indicate that the schemes contributed to reducing the energy burden. The surveys and the modelling indicate slightly different findings in terms of the extent to which the EPG and EBSS strands of the schemes affected energy burden, but not to an extent that they contradict each other on the contribution of the schemes overall.

[19] Table 4.2 in the main report, shows that higher income groups had higher energy consumption levels at baseline, and also would have reduced their energy consumption to a greater extent in the absence of the scheme.

Overall, the evidence indicates that it is **highly probable** that the schemes contributed to limiting an increase in the proportion of households experiencing fuel poverty compared to a no intervention scenario.

2.3.3. Non-energy household expenditure, borrowing and saving

The contribution claim being tested was:

The schemes limit increases in household borrowing, cuts in essential spending (e.g., food, essential clothing, medicines), and cuts in non-essential spending (e.g., holidays or meals out) and savings.

Assessing the strength of the contribution claim

First, applying the consistent chronology test, this is fully passed, as the potential for the schemes to influence overall household expenditure is not time-bound. However, given that the schemes were designed to mitigate against the negative effects of potentially higher energy bills on household spending (amongst other outcomes) and that energy bills are higher during the winter, it would have been optimal for households to receive the support in time for the winter. Therefore, the same limitations that apply to the causality of the schemes which were launched towards the end of / after winter 2022/23 on other outcomes also apply here (though to a lesser extent). Energy demand modelling predicts observed, and counterfactual effects, for the two relevant quarters that the energy affordability schemes were in place.

Next, applying the authoritative source test, the LCFS provides the largest national sample of household spend in the core energy and non-energy spend categories, and is the dataset regularly used by ONS for this purpose, which makes it the best available data source to use for modelling the impact of the energy affordability schemes on household expenditure. It is still subject to limitations around its reliance on self-reporting but overall, this test is passed. The evaluation has not reviewed any authoritative evidence of the contribution of the schemes towards borrowing. Whilst trend data is presented of borrowing over time, this is not an authoritative source of contribution and causation.

It would be challenging to observe a signature of the schemes in statistics on household spending. A signature might occur if a sudden shift in the amount or timing of changes in spending aligned with the timing of the introduction of the schemes, but this would require micro-levels of data. The statistics set out in the main report provide information on trends in household non-energy spending with some of the timing of shifts in trends indicating a potential effect of the energy price rise on household spending. The statistics do not indicate a specific shift in response to the introduction of or the nature of the schemes. There is therefore no signature of the schemes observable in the data.

Finally, on convergent triangulated sources, there is convergence between the secondary data analysis and interim evaluation findings in this section. Further, the findings on non-energy spend and household borrowing are consistent: the evidence does not indicate that household borrowing increased to account for non-energy spend, or that household borrowing was limited but that non-energy spend increased (as one strategy that households could have adopted

instead of reducing energy and non-energy spend would have been to go into higher levels of debt, which might have indicated that the schemes had not had the desired effect of both limiting reductions in essential household spending and limiting household borrowing). There is also convergence of the findings in this section with the evidence in Section 4.5, which suggests that the schemes contributed to limiting the number of households that would not be able to pay their energy bills and who go into energy debt with their supplier.

Overall, the evidence indicates that it is **probable** that the schemes contributed to households being able to maintain spending on essential goods and services, compared to a no intervention scenario. There is divergent evidence that while household borrowing and debt did not increase over the intervention period, there was an increase in household financial distress over this period, especially among those demographic groups that might be expected to be at higher risk of energy burden or underheating. However, it is not possible to ascertain if the avoidance of an increase household borrowing and debt is due to the energy affordability schemes and there is no counterfactual to test against in this strand of the analysis.

The evaluation was not able to assess the secondary contribution claim on the macroeconomic impacts of the schemes. It was challenging to estimate the effects of the schemes within the scope of this evaluation. The evaluation could not disentangle the macro effects between the domestic and non-domestic schemes. It was also not possible to estimate the net effects of the schemes on inflation compared to the counterfactual, since it is not possible to disentangle the different ways in which households responded to EPG compared with EBSS.

2.3.4. Health and Wellbeing

The contribution claim being tested was:

The schemes limit negative mental and physical health impacts arising from increases in energy bill costs (including limiting instances of cold-related illnesses that can arise from under-heating).

Assessing the strength of the contribution claim

As per the analysis in Section 4.1.5 of the main report, where the schemes were introduced in time to affect household affordability to heat the home during the coldest months of winter they pass the consistent chronology test, because the largest schemes (EPG in GB, EBSS GB) came into effect just before winter – in October 2022 whilst AFP GB, EPG in NI and EBSS AFP NI came into effect in winter 2022/23. EBSS AF GB and EBSS AF NI came into effect in February 2023 – towards the end of winter 2022/23. The rest of the schemes came into effect either in the spring or summer 2023.

In terms of the authoritative source test, there is sufficient authoritative evidence of the link between underheating and cold-related illness. Therefore, for the authoritative source test to be passed, the evidence of the schemes' contribution to limiting underheating must be demonstrated. As set out in Section 4.1, the evaluation has concluded that the schemes' effects on underheating were probable.

Evidence from the surveys collected for the interim evaluation and the descriptive analysis of household members' self-reported health during and after the intervention period, and the modelling of the potential for the schemes to have contributed to this, do not pass the signature test.

The findings from the interim evaluations on the reported links between the energy price rise, household costs, home heating and health; and the modelled effects of limitations on underheating on health converge to indicate that the schemes had a likely positive impact on physical health. Therefore, the convergent triangulated sources test is passed.

The extent to which the schemes contributed to improved physical and mental health compared to a no intervention scenario is dependent upon the extent to which they limited household underheating. The link between the schemes and underheating has been assessed as probable in Section 4.1. Authoritative literature indicates that a link between underheating and health and wellbeing is highly probable. Applying the strength of evidence framework for this evaluation, this would indicate that there is a **probable** contribution of the schemes to health and wellbeing.

2.3.5. Household energy debt

The contribution claim being tested was:

The schemes contribute to limiting the number of households that would not be able to pay their energy bills and who go into energy debt with their supplier.

Assessing the strength of evidence

The analysis presented in Section 4.5 of the main report was limited by the fact that the Ofgem data analysed applies only to GB, though the Interim Evaluation evidence also covers NI.

The evidence presented passes the consistent chronology test – the schemes which affected the majority of the GB populations were distributed in time to have the effects described in the main report. The evidence therefore passes the consistent chronology test since the changes in debt align with start and end dates of the schemes. The timing of the intervention coincides with slowing in the rate of increasing energy debt and a continued reduction in the number of accounts in debt or arrears, which is also consistent with the chronology of the intervention.

The Ofgem and the Family Resources Survey data sets are both authoritative as observed data by the GB energy regulator and an official government survey which collects data from a representative sample of UK households respectively. However, these sources do not – in themselves - prove or demonstrate a causal relationship between the schemes and the observed trends. The data has not been modelled or compared to assess contribution – the statistics above are descriptive. Therefore, they are only authoritative sources of the trend data, not of the contribution.

There was a notable uptick in debt, driven by increases in arrears, after the schemes ended, which suggests a signature that the schemes did limit energy debt during the schemes. Further, similar to the arguments made in Section 4.2.5 (fuel poverty), as the process

evaluations for the schemes in GB and NI showed that the schemes, together, reached a large majority of the households in both jurisdictions and that they unequivocally, where received, reduced costs for households they inherently create signature evidence of a contribution.

The evidence presented in the main report from the surveys and descriptive analysis of different sources of data on debt converge in indicating an effect of the schemes on limiting household energy debt so the convergent triangulated sources test is passed.

Overall, the evidence available indicates that it was highly probable that the schemes contributed to reducing energy debt compared to a no intervention scenario.

2.3.6. Energy suppliers

The contribution claim being tested was:

The schemes help limit the risk of energy supplier insolvency and maintain the financial health of suppliers over the intervention period primarily by limiting energy debt and improving cashflow.

Assessing the strength of evidence

In terms of consistent chronology test, the schemes were introduced at a time period when there was still a risk of energy supplier exposure to financial stress, as they were introduced at a point in time when energy bills were high and, going into winter 2022, households might have been at a higher risk of non-payment given that energy bills would have been higher (as they are typically higher in the winter months). The data reviewed in this section describes the situation both before and after the schemes were introduced. The consistent chronology test is passed.

In terms of applying the authoritative source test, due to commercial sensitivities in the data, the evaluation team had limited oversight of its modelling approach and were not able to comment in detail on its authoritativeness. While Ofgem is an independent agency with an interest in constructing an accurate picture of risks in the market, it must also be considered that the counterfactual argument relies on self-reported estimations through stress tests which have been verified by authoritative sources (Ofgem and National Audit Office) and evidence obtained through consultations with energy suppliers. These subjective assessments by suppliers may be subject to optimism/pessimism bias and could be subject to strategic responses, but without access to the underlying data it is not possible to ascertain with any certainty these biases. The authoritative source test is therefore not passed.

Evidence indicates that the signature test is passed. Suppliers interviewed for the interim evaluations reported that the schemes made an improvement to their financial situation compared to a no intervention scenario. Whilst they were not able to show how any improvement in their financial situation was uniquely traceable to the schemes, the Ofgem data does indicate a signature of the schemes in the case of a few GB suppliers.

Finally, on convergent triangulated sources, the test is not passed because there is evidence that suggests it was because of factors external to the schemes, rather than the schemes, that

energy suppliers in GB were less likely to go into debt; and the evidence also indicates that in NI there was less of a need for the schemes.

Given the Ofgem signature evidence, it is highly probable that the schemes contributed to mitigating against supplier insolvency in GB (where the risk was higher). This is the case even though the authority of the source has some limitations (see above) and sources do not converge overall.

Annex 3. Cost Benefit Analysis methodology

This section sets out the methodology of the Cost Benefit Analysis (CBA) conducted on the energy affordability schemes. It also supplements the findings of the CBA presented in the main report with more detailed tables on the costs and benefits estimated.

Overview of VfM approach

A CBA assigns monetary values to both the costs and benefits of an intervention, allowing for the evaluation of the net benefit of the intervention in monetary terms, relative to a counterfactual. For this CBA, the counterfactual is the scenario in which the schemes were not implemented and there was no other government intervention directly into energy costs in response to the 2022 crisis.[20] In this counterfactual, energy prices would have risen at market rates, and households would have received no price or income support to help them respond to high energy prices. Without the support, more households would have faced energy burden, reduced consumption to a greater extent, and been at greater risk of financial distress and unsafe heating behaviours.

To provide a comprehensive assessment of the value for money of the schemes, two distinct approaches to the CBA were applied:

- **The social value approach:** This method considers the schemes' value to society; hence it accounts for the programme's overall effect of public welfare. While social benefits can include a wide range of impacts, this evaluation, focuses on the additionality of the schemes in terms of welfare impacts and health benefits. Social costs in this analysis include: the increase in national debt, administrative costs of the schemes for suppliers, environmental costs, and fraud and error costs.
- **The Exchequer value approach**: This approach reflects only for the direct effects of the schemes on public finances. Exchequer costs consider the total costs to government, including the value of the grants and administrative costs. Exchequer benefits include financial benefits directly to government, such as increased tax payments or savings from reduced government resource (e.g. NHS savings related to health benefits).

The 4Es framework was also applied,[21] which provides transparent evaluative judgements based on multiple strands of evidence across four key dimensions:

- **Economy:** Assesses whether scheme objectives were achieved at minimum cost, considering delivery models, deadweight, and alternative support scenarios.

[20] See Annex B1 for specification of counterfactual in relation to "do nothing" scenario.
[21] King (2018), OPM VfM Working Group Report

- **Efficiency:** Evaluates how well inputs (e.g. funding, resources) were converted into outputs, including delivery timelines, cost control, and ease of access for households.
- **Effectiveness:** Measures whether the schemes met their intended goals, using outcome and impact evaluations to assess behavioural changes and overall success.
- **Equity:** Examines how different social groups were affected, using geo-demographic and income data to understand distributional impacts and assess disparities.

This combined approach enables a more nuanced understanding of scheme performance and supports future improvements in cost-effectiveness.

Guidance and literature supporting the development of this approach

As well as following the HMT Green Book guidance when producing this value for money analysis, the evaluation team also sought out evaluations of similar schemes to households and businesses to understand how CBAs were conducted for these. In particular, the methods needed to approach the large-scale transfer payments made to households.

In this evaluation, a key distinction between the social and exchequer approaches is how the costs of the grants are handled. In this context, grants pass purchasing power between central government and households and do not involve the consumption of resources, as such they are considered transfer payments.[22] In line with Green Book guidance, transfer payments should not be included in overall estimates of Net Present Social Value, and so are not included in the Social CBA, but are included in the Exchequer CBA.

It is important to note this difference as the majority of the costs associated with the schemes are the discounts disbursed. Consequently, the social BCR produced by this analysis is likely to appear high, but reflects the methodology set out by HMT. The social value CBA excludes the Exchequer costs of the schemes but also excludes the benefits which constitute a transfer from Exchequer to consumer. However, HMT Green Book guidance includes the following, "*Where transfers may have a distributional impact it may be appropriate to quantify and show these effects... This could involve showing the transfer of equivalent costs or benefits from one group in society to another, particularly when relevant to distributional objectives.*"[23] Therefore, in the VfM analysis, the benefits include only the difference between the welfare weighted and unweighted consumer surplus benefits, representing the distributional impact of the schemes. The costs and benefits included are described in more detail below.

[23] HM Treasury Green Book (2022) para 6.3.

3.1. Costs included in the CBA

Table 3.1 below sets out the approach to estimating the costs of the schemes.

Table 3.1 Approaches to cost assessment and related monetisation

Costs	Estimation approach	Source data
Transfer payments	Capturing the cost of government funds from the transfer of £36.3 billion from the Exchequer to consumers through consumer surplus benefits	DESNZ transparency publications for domestic schemes, including payments to suppliers and values of payments to households for application-based schemes
Cost of scheme delivery (government & agencies)	Estimates provided by DESNZ and delivery organisations. As a programme delivery cost this would be included as standard in social cost benefit analysis, and also contributes to the Exchequer costs of the schemes	DESNZ scheme closure reports and final DESNZ finance figures post-reconciliation
Time costs to public	Assumptions based on the estimated time taken to complete applications and the number of households who completed applications from DESNZ monitoring data. The total number of hours spent applying and the average hourly value of time were used to calculate the opportunity cost. Assumes that an application would have taken 30 minutes to complete	HMT Value of Time values shows that on average an hour of non-work time is worth £6.59 per hour (2022-2023 prices).[24]
Environmental costs	The environmental impact of greater consumption of energy compared to the modelled counterfactual was estimated using the DESNZ Valuation of energy use and greenhouse gas (GHG) emissions guidance published alongside the HM Treasury Green Book.	Annex 1 DESNZ carbon tables[25] to estimate carbon values per tonne of CO_2 for each fuel type, aggregated to number of households heating with each fuel type. See calculation in Annex A Table 3.4: takes difference in energy use over 2 quarters (6 months) kWh per household compared to the counterfactual in the administrative data, aggregated to national level by number of households using each fuel type in the 22-23 censuses and applies DESNZ 2023 carbon intensity tables[26] to convert kg CO_2e per kWh, for which carbon costs (£) are calculated.

[24] Batley and Dekker, 2023: Source Valuing consumers time cost benefit analysis
[25] DESNZ, 2021. Valuation of greenhouse gas emissions: for policy appraisal and evaluation
[26] DESNZ Energy and emissions projections

Finally, while there may be longer-term costs to future generations from the impact of the costs of the energy affordability schemes contributing to national debt, these interest costs are outside of the scope of the scheme-level CBA as agreed with DESNZ.

3.1.1. Costs to the Exchequer of the schemes

The figures used for the Exchequer costs of the schemes are based on DESNZ's published statistics of payments made to energy suppliers or directly to households through application schemes (Table 3.2). Figures for EPG include the final reconciliation payments made to suppliers.

Table 3.2 Support delivered through domestic energy affordability schemes in GB and NI

Scheme	Expenditure (£ million)[27]	Number of households reached or payments made	Scheme start date	Scheme end date
GB				
EPG	23,646	~29,300,000[28]	1 October 2022	31 March 2024[29]
EBSS GB	11,364	28,804,096	1 October 2022	31 March 2023
EBSS AF	58	145,190	27 February 2023	31 May 2023
AFP	369	1,860,830	January 2023	30 June 2023
AFP AF	18	89,750	6 March 2023	31 July 2023[30]
EBSS AF CC	4	6,408	1 September 2023	31 December 2023
NI				
EPG	301	~802,200[31]	1 November 2022	31 March 2024[29]
EBSS AFP	492	819,470	16 January 2023	30 June 2023
EBSS AF	3	5,340	27 February 2023	31 May 2023
Total	36,255	-	-	-

[27] This is based on DESNZ final publication of reconciliation of the payments under the EPG schemes in August 2025 and for other schemes as at August 2024. Source: Domestic energy affordability grant schemes: statistics
[28] This is based on the number of domestic electricity meters in Great Britain. See Smart Meter Statistics in Great Britain: Quarterly Report to end December 2022 GOV.UK
[29] On 1st July 2023 the Energy Price Cap fell below the EPG meaning the EPG support no longer applied although the scheme continued until 31 March 2024.
[30] Closed to new applications 31st May 2023.
[31] This is based on the number of domestic electricity meters in NI in 2022. This will be an overstatement of the number of households given that it includes vacant properties and dwellings can include multiple meters. See Sub-national electricity consumption statistics in Northern Ireland - GOV.UK.

Costs of scheme delivery

A range of costs were incurred to the public purse to delivering the schemes. These include costs from policy set up such as software development, the costs for contracted scheme audit and contact centres, delivery costs including financial processes, compliance and reporting and scheme closure costs. The costs associated with the EBSS and AFP schemes totalled £15.2mn, while EPG costed £51.2mn. Note that some of the costs for administering the AFP schemes are included within the EPG scheme costs due to shared staffing and other costs between the two schemes. However, the inclusion of these costs under EPG has a minimal effect on the VfM assessments given the different scale of these two schemes.

Information on the costs to deliver the schemes are taken from the individual scheme closure reports and other financial reconciliation data provided by DESNZ.

3.1.2. Time costs to public

To apply for the EBSS AF and AFP AF households were required to directly apply for support. The number of applications for EBSS AF is estimated at 216,830 while there were 115,340 applications for AFP AF. To estimate the time related cost to the public, we refer to DfT Appraisal guidance[32] which estimates that on average an hour of non-work time is worth £6.59 per hour (2015 figure, uprated to 2023 prices).[33] Based on supplier interviews, it is assumed that on average applications take 30 minutes to complete so **the estimated total cost to the public due to the time taken to apply for support equates to £1.09mn.**

3.1.3. Fraud and error

From the inception of the programme, the Department aimed to minimise rates of fraud and error involved in the schemes, involving the Public Sector Fraud Authority during design stages and learning lessons from financial support provided during the COVID-19 pandemic. A review of fraud and error rates conducted by the National Audit Office (NAO) concluded that fraud and error rates across domestic and non-domestic schemes were estimated to be 0.7% of the value of scheme payments, which we estimate to be equivalent to £253.8m. Further discussions with the DESNZ team responsible for providing evidence to the NAO noted that the majority of these erroneous payments were error-related, rather than fraudulent.

This evaluation has applied the 0.7% figure to all scheme payments. The value of £253.8m for fraud and error is higher than the £233.4m in fraud and error for the domestic schemes estimated in the DESNZ report and accounts for 2023-24[34]. We did not use this figure because this set of report and accounts pre-dated the EPG reconciliation process and did not include the AFCC scheme. Although, using the same proportions as per the original DESNZ estimates would have slightly reduced the social cost of the schemes, this does not change the main conclusions of the CBA.

[32] DfT 2025. Tag data book
[33] Guidance from University of Leeds published by FCA "Valuing Consumers' Time in our Cost Benefit Analysis" suggests that the value of time assigned to travel represents a reasonable proxy for the value of time assigned to finance such as applications
[34] DESNZ annual report and accounts 2023 to 2024, page 43.

A breakdown of our fraud and error estimates by scheme is shown in the table below. This is based on fraud estimates from the NAO report applied to updated cost reconciliation figures from DESNZ. To match these two sources, we have assumed that EBSS for Continuous Cruisers (CC) is a subset of the EBSS AF scheme. Similarly, because the NAO report provides a total UK figure for EPG we have distributed the NAO reported £224.9m in fraud and error proportionally between the EPG in GB and NI. In both cases, we assume that the rate of fraud and error is the same each side of the split.

Table 3.3 Fraud and error costs compared to total scheme payments in GB and NI (£mn)

	GB		NI	
Scheme	**Total Payments**	**Fraud estimate**	**Total Payments**	**Fraud estimate**
Energy Bills Support Scheme (EBSS)	11,364	79	492	3.4
Energy Bills Support Scheme Alternative Funding (AF) incl. Continuous Cruisers (EBSS AF CC) in GB	61.90	0.43	3.2	0.002
Energy Price Guarantee (EPG)	23,646	165.5	301	2.1
Alternative Fuel Payment (AFP)	369	2.6	-	-
Alternative Fuel Payment Alternative Funding (AFP AF)	18	0.1	-	-
Totals	35,458	248	796	6

Table notes: Figures may not sum exactly due to rounding. *Combined with AFP in NI

3.1.4. Environmental costs: Carbon costs from additional energy use compared to the counterfactual without the energy affordability schemes

Analysis of the audit and NEED dataset provides a UK-representative estimate of the total energy usage observed in the intervention period, and allows us to model the predicted energy usage that would have happened at higher prices in the absence of the schemes.

Total daily energy usage (kWh) was estimated from the audit and NEED dataset on a large sample of the GB representative population. This actual gas and electricity use was compared to the predicted lower levels of energy consumption in the absence of the energy affordability schemes. These were derived using the values reported in Tables 7.5 and 7.11 of Annex B.

The resulting difference in daily energy use for GB at the meter level.[35] This, was aggregated to the UK-wide level and increased pro-rata to cover the two quarters of the energy affordability schemes intervention, and converted to CO_2e per kWh for each energy type using DESNZ 2023 carbon intensity tables.

For oil heating households, actual data is not available in the audit and NEED dataset, and the LCFS gives an index of quantities consumed which does not directly translate into kWh. In place of observed data, estimates of average consumption for oil usage were used.[36] The % index change in consumption of oil from the LCFS (Annex B Table 2.5) of -1.3% is taken as an estimate of the amount of additional oil consumed as a result of AFP (GB) and EBSS AFP (NI).

The total estimated carbon cost associated with the energy affordability schemes—based on the modelled difference in energy usage with and without the interventions—is £899 million across the UK. This estimate covers the six-month period during which the Energy Bills Support Scheme (EBSS) and Energy Price Guarantee (EPG) were in effect over winter 2022–2023.

Table 3.4 Carbon Cost Calculations for additional energy usage due to the schemes: Actual (baseline) vs predicted (counterfactual) energy KwH usage in £2023 kg CO_2e

Energy type	Electricity	Natural gas	Heating oil
Difference in energy use over two quarters (6 months) KWH per household	427.05	1824.15	280.79
Number households per fuel type (21-22 Census data UK)	2362860	20733230	1937458
Difference in energy use over two quarters (6 months) KWH, aggregated to national level	1,009,059,241	37,820,505,267	544,018,026
DESNZ 2023 carbon intensity tables: kg CO_2e per kWh	0.207	0.185	0.3
Differential impact (kg CO_2e)	208,875,263	6,996,793,474	163,205,408
Carbon Cost £2023 kg CO_2e	£27,709,027	£928,182,382	£21,650,544
Total Carbon Cost	£977,541,953		

Source: Administrative data and Annex 1 DESNZ 2021 carbon tables.

[35] Note that although for both the price elasticity modelling and the calculation of carbon costs, average daily consumption figures were estimated from the Combined audit and NEED dataset, the figures differ slightly from those reported in Annex B due to differences in the unit of observation. For carbon costs, average meter level figures were estimated, while for Annex B calculations the modelling accounts for variations in day and night usage and tariff type.

[36] Certas estimates that the average oil-heated household in the UK uses roughly 26,999 kWh of energy per year. Assuming 80% of oil heating takes place in Q4 and Q1, for the 2 quarters of the intervention period = £21,599 kwh: How much heating oil should I purchase?.

3.2. Benefits

Table 3.5 below sets out the approach to estimating the benefits of the schemes.

Table 3.5 Approaches to benefit assessment and related monetisation

Benefits	Estimation approach	Source data
Consumer surplus welfare weighted uplift. Based on Consumer Surplus from increased income and reductions in electricity, gas and oil prices	LCFS analysis (UK-representative) of Equivalent Variation from reduced energy prices applied to all income groups through consumer surplus benefits. Difference between distributionally welfare unweighted and weighted benefits: Aggregated to total population	LCFS
Health benefits due to avoided underheating: Total QALY value (mortality & morbidity) per year	HIDEEM modelling (UCL) of predicted health impacts of indoor temperature and humidity impacts in absence of energy affordability schemes: QALYS value of avoided mortality and disease: Aggregated to total population	HMT Green Book for QALY value of £70,000 HIDEEM LCFS data for estimating expenditure
Exchequer value from total health savings to NHS (avoided resource cost) benefits	HIDEEM modelling of predicted NHS costs of indoor temperature and humidity impacts in absence of energy affordability schemes: Aggregated to total population	HIDEEM
Exchequer value from increased VAT receipts due to higher non-energy spending	Additional VAT revenue was calculated by applying UK tax rates to the maintenance of consumption attributed to the schemes (20% on food, water, health, recreation, communication, transport, and education; 5% on energy spend) during the intervention period.	Modelling of LCFS

HMT Green Book Guidance states that transfers of taxpayer money to consumers should only be considered in appraisals to the extent that they have distributional consequences. As set out in the summary CBA table the benefits are largely being measured as the resulting utility benefits to consumers. This is calculated as the change in consumer surplus from lower energy costs, and the avoided health and wellbeing impacts due to avoided underheating.

3.2.1. Consumer welfare effects: Mitigating impacts of energy price rises

The welfare benefits of mitigating impacts of energy price rises are measured in terms of utility benefits to consumers measured as the consumer surplus welfare weighted uplift based upon the estimated demand elasticities from the econometric modelling.

A consumer surplus is generated due to households not needing to spend as much to heat their homes to a comfortable temperature. This is estimated using the Equivalent Variation (EV) calculation which gives the increased consumer surplus from paying lower prices for energy and receiving income support to spend on energy and non-energy goods and services (through demand modelling in the LCFS). This captures the full consumer surplus benefits of the EPG and EBSS transfer. Some of this consumer surplus benefit is a simple transfer of public funds into reduced energy bills and/or income support. Given that the transfer costs of the scheme are excluded from the social value CBA, so too should the transfer benefits be excluded, which would net off in the CBA.

Through the modelling of price and income elasticities of demand for energy and non-energy consumption and the corresponding demand systems, the compensating variation (CV) and equivalent variation (EV) can be calculated for both the EPG and the EBSS for electricity and gas. CV and EV give a monetary estimate of the value of the policy to different income groups or consumer types (deciles) – i.e., how much money a household would need to be given to achieve the same utility or welfare as a price change.[37] CV and EV were calculated through the price and income elasticity modelling described in Annex B1 and shown in Annex A Tables 3.6 and Table 3.7.

EV quantifies how much money a household would need to receive to be as well off after the energy affordability schemes were provided as they were without the energy affordability schemes. EV assesses the amount of money needed to be provided in the counterfactual situation by comparing it to the current situation. In other words, EV is the estimate of the required income to keep the household at the counterfactual level of utility, given a price change. As the schemes improved affordability, EV is negative, indicating that there would have been a loss in utility without the schemes.

Tables 3.6 and 3.7 show the unweighted Equivalent Variation (EV) associated with each model for electricity and gas by decile group. For the GB sample, to achieve the same consumer surplus as that provided through the energy affordability schemes, electricity heated

37 Oil heated households did not receive a price change, so there is no need to estimate EV/CV for oil heated households as the EV/CV is £600.

households would require £721.20 while gas heated households require approximately £775.50 over the intervention period (Q4 2022 and Q1 2023).

For the NI sample, to achieve the same consumer surplus as that provided through the energy affordability schemes, gas heated households would require £843.90 over the intervention period (Q4 2022 and Q1 2023). The sample of electricity households in NI is too low to estimate EV for electricity, so the gas value can be applied.

The EV for oil heated households in GB and NI is simply the £600 EBSS AFP payment, which is directly translatable as their consumer surplus from the scheme.

Total households in UK based on ONS 2023 figure of 28,358,000.[38] Note that this differs from the total number of households summed across the three censuses for UK nations. However, the UK and Great Britain totals, and 2021 estimates for Scotland, are not accredited official statistics. Aggregation therefore applies the percentage of households heating with each energy type from the relevant censuses to the ONS total number of households (which is lower and provides a more trusted and conservative estimate. Censuses provide statistics for:

- Gas and multiple sources of heating households: Aggregated to 82.6% of GB households who heat with gas, including 73.8% of GB households who use gas as their primary energy sources for heating and 8.1% of the population who use multiple types of central heating (i.e. combines gas with other methods like electric or oil).
- Electricity households: Aggregated to 8.5% of GB households who use electricity as their primary energy sources for heating.
- Oil and other heating households administered as a combined £600 payment to oil heated houses, aggregated to 8.9% of GB households who use oil and other (non-electricity and gas) as their primary energy sources for heating.
- NI aggregation of £843.90 to 46.6% of households who heat with gas and multiple sources and 1.6% of electricity heating households, and £600 to 51.8% of households who heat with oil and other sources in NI in 2023 based on ONS statistics.

Mathematically, the CV is defined as;

$$CV = e(p^1, u^1) - e(p^1, u^0)$$

$$= e(p^0, u^0) - e(p^1, u^0)$$

$$m - e(p^1, u^0)$$

Where, p^0 and p^1 are price vectors[39] before and after the policy is implemented, m is income (or in this case, total expenditure), and u^0 is the household's initial level of utility. There are corresponding quantities, q^0 and q^1. To break this down, a given household has a certain

38 Families and households in the UK: 2023
39 The set of prices for all goods in the demand system expenditure function.

budget constraint, and at price level p^0, the household consumes q^0 units of energy (and other commodities) and enjoys a level of utility, u^0. Should the price of energy rise to p^1, the household's consumption of energy, and utility level, falls to q^1 and u^1. The household is therefore on a new budget constraint. CV identifies that subsequent to a higher price for energy, how much would the government have to compensate a household so that they can enjoy the same level of utility as before the price increase.

Similarly, EV is defined as;

$$EV = e(p^0, u^1) - e(p^0, u^0)$$

$$= e(p^0, u^1) - e(p^1, u^1)$$

$$e(p^0, u^1) - m$$

In this case, the post-policy level of utility and the initial price of energy are utilised rather than the initial level of utility and the post-policy price. The CV and EV will be negative in this case as the households will require income to be compensated.

Tables 3.6 and 3.7 show the CV and the EV associated with each model for electricity and gas by decile group based on analysis of the LCFS (LES model). When broken down by household income, the CV and EV vary significantly. Higher income households received a greater benefit, when comparing the equivalent and compensating values of the supports. Although high-income households are likely to be more insulated from price increases in energy, they are also likely to have consumed more energy, hence the higher EV and CV values.

Table 3.6 CV and EV for Gas and Electricity by Income Decile [GBP]: GB LCFS (LES model)

Income decile	1	2	3	4	5	6	7	8	9	10	Total sample average
Electricity GB (LES)											
CV	598.9	603.8	658.9	673.7	702.1	776.3	802.6	790.5	842.0	1,026.5	725.1
EV	596.5	601.6	655.7	670.4	698.4	771.7	797.5	785.7	836.7	1,018.6	721.2
Gas GB (LES)											
CV	637.3	690.5	711.1	724.2	753.8	777.9	804.9	822.8	875.8	968.8	779.4
EV	634.9	687.4	707.8	720.8	750.1	773.9	800.8	818.4	871	963.1	775.5

Table 3.7 CV and EV for Gas by Income Quintile [GBP]: NI LCFS (LES model)

Income Quintile	1	2	3	4	5	Total sample average
Gas (LES)						
CV	£765.1	£796.5	£851.7	£882.4	£968.9	£845.9
EV	£763.8	£794.8	£849.6	£880.1	£965.9	£843.9

Note: decile categories defined on population-representative total sample and group averages calculated for estimation sample and intervention period only. As a consequence, the average of the five EV/CV estimates for each quintile do not equal the sample average.

3.2.2. Welfare weighting

Distributional considerations: The social value CBA accounts for the distributional benefits of the scheme by weighting the value of the scheme to lower income groups higher than high income households through a process known as welfare weighting. Welfare weighting accounts for the fact that a universal transfer is more valuable to those with more constrained budgets, compared to those with higher incomes and therefore the benefit of an additional £ is higher for a lower income household than a higher income household.[40] This added value is captured in the welfare weighted uplift, which is the difference between the total consumer surplus value of the scheme and the welfare weighted consumer surplus value of the scheme. Welfare weighting is an estimate of the social welfare benefits of the schemes and is not included in the Exchequer value approach.

Distributional weights capture the fact that an additional unit of income improves the welfare of a low-income household more than that of a higher-income household. It is based on the economic principle of decreasing marginal utility of income. It is standard practice and recommended by HM Treasury Green Book to also present policy costs savings using distributional weights.

In line with the Green Book guidance published by HMT, and the most recently MHCLG Published Guidance on welfare weights (2025)[41] the marginal utility of income of 1.3[42] is derived from an isoelastic utility function of income and taken to be:

$$\text{MU (Income decile I)} = \frac{\mathbf{1}}{(\textbf{Average income of decile i})^{\mathbf{1.3}}} \quad \text{where } \mathbf{i} \in [\mathbf{1}, \mathbf{10}]$$

From this we can derive distributional weights:

$$\textbf{Distributional weight} = \frac{\textbf{MU (Income of decile i, categorical group j)}}{\textbf{MU (Average income across population)}} \text{ where } \mathbf{i} \in [\mathbf{1}, \mathbf{10}]$$

The MHCLG Appraisal Guidance uses income data from the Household Below Average Income Series published by DWP for year 2019/20 which uses the Family Resource Survey. The below calculations provide an example of how the weights are estimated for a household in the highest decile.

The average weekly income of a household in the highest decile is = £1,363.
The median weekly household income for all UK is £547.

Therefore, the weight = $(547/1{,}363)^{1.3}$=0.31.

In the absence of data specific for Northern Ireland at the income quintile level, an average of the weights applied for GB at the decile level has been used (see Table 3.8).

41 The MHCLG Appraisal Guide (2025)
42 Section H9 of The MHCLG Appraisal Guide (2025)

Table 3.8 Distribution weights for electricity and gas heating households (GB) based on mean weekly household income by income decile in Family Resources Survey

	Lowest income	2nd	3rd	4th	5th	6th	7th	8th	9th	Highest income
Mean weekly household income (£)	£204	£307	£376	£444	£512	£582	£665	£771	£928	£1,363
Distributional Weights	3.60	2.12	1.63	1.31	1.09	0.92	0.78	0.64	0.50	0.31
Electricity GB (LES)	£597	£602	£656	£670	£698	£772	£798	£786	£837	£1,019
Electricity GB (LES) with Welfare Weights	£2,147	£1,275	£1,069	£878	£761	£710	£622	£503	£418	£316
Gas GB (LES)	£635	£687	£708	£721	£750	£774	£801	£818	£871	£963
Gas GB (LES) with Welfare Weights	£2,286	£1,457	£1,154	£944	£818	£712	£625	£524	£436	£299

Note: Average weekly income at income deciles calculated at UK-level, due to low sample sizes in the Family Resources Survey at GB and NI level. This matches the UK-wide weights in the MHCLG Appraisal Guide (2025), ensuring compliance with guidance weights.

Table 3.9 Distribution weights for gas heating households (NI) based on mean weekly household income by income quintile in Family Resources Survey

	Lowest income	2nd	3rd	4th	Highest income
Distributional Weights	2.86	1.47	1.005	0.71	0.405
GAS NI (LES)	£764	£795	£850	£880	£966
GAS NI (LES) with Welfare Weights	£2,184	£1,168	£854	£625	£391

Note: Average weekly income at income quintiles calculated at UK-level, due to low sample sizes in the Family Resources Survey at GB and NI level. This matches the UK-wide weights in the MHCLG Appraisal Guide (2025), ensuring compliance with guidance weights.

3.2.3. Estimating VAT generated from total consumer surplus of energy and non-energy spend

To estimate the total VAT generated from the total consumer surplus, the 20% VAT rate was applied to the weekly total additional non-energy spend on the categories of “Food, water, and health”, “Alcohol, narcotics, and recreation”, and “Communication, transport, and education”. This figure is then compared to the counterfactual from the energy and non-energy demand modelling (as described in Annex B1) to calculate the different. Accommodation is excluded as it is not subject to VAT. The calculation also takes into account the loss of VAT on avoided energy spend, at a VAT rate of 5%.

For example, with gas heated homes, the total weekly differential between actual and counterfactual non-energy spend is £14.38 per week: £1.86 from food, water, and health, £6.12 from alcohol, narcotics, and recreation and £6.40 for communication, transport, and education. This was converted to a half yearly amount (£373.80) and multiplied by the total number of households using gas and combined heating type in the UK, based on national census data (23,427,045 households)[43]. The total additional spend amounts to £8,757,076,283, with a 20% VAT rate of £1,751,415,257.

For the energy spend in gas heated households, the total difference between actual and counterfactual spend was estimated to be -£7.50, or -£195 for the half year. Aggregated to 23,427,045 households, the total difference between actual and counterfactual spend on gas amounts to -£4,568,273,779, of which 5% would have been lost in VAT without the schemes (£228,413,689). The estimated net VAT contribution from the energy affordability schemes on gas household spend is £1,523,001,568.

The same approach was applied to electricity-heated households[44] and homes which use other types of heating[45]. The net VAT contribution of Domestic Energy Affordability Schemes amounts to £2,119,265,178.

3.2.4. Health and wellbeing impacts (monetised through Quality Adjusted Life Years) from avoided underheating of home

The impact of the energy affordability schemes on public health, in terms of avoided health issues due to people underheating their houses, can be valued in terms of annual QALYs.

- The HIDEEM modelling predicted that, in the absence of the energy affordability schemes, the cost to the UK population in terms of additional mortality effects from temperature and humidity related deaths would have been equivalent to £9.8 million over an annual period, compared to the counterfactual without the scheme, and £1.3

[43] For Gas and multiple sources of heating households: Aggregated to 80.2% of the population who heat with gas, including 71.0% of the UK population who use gas as their primary energy sources for heating and 9.2% of the population who use multiple types of central heating (i.e. combines gas with other methods like electric or oil).
[44] Electricity households: Aggregated to 8.1% of the UK population who use electricity as their primary energy sources for heating.
[45] Oil and other heating households administered as a combined £600 payment to oil heated houses, aggregated to 11.7% of the UK population who use oil and other (non-electricity and gas) as their primary energy sources for heating.

billion in avoided morbidity QALYs under the energy affordability schemes, compared to the counterfactual without the scheme.

- The HIDEEM model also predicts the savings to the NHS associated with these changes in physical and mental health outcomes[46]. Savings to the health service are estimated to be £325 million. Note, NHS savings are a separate calculation to the QALY values, and represent an Exchequer rather than a social welfare cost.

See Annex B Section 4 for detail of HIDEEM monetisation method.

3.3. Apportioning the costs and benefits between EPG or other schemes

Section 5.4.2 of the main report presents the results of the CBA for different schemes. This analysis compares the costs and benefits for the UK EPG scheme to all of the other schemes combined (i.e. all EBSS and alternative fuel (AFP) schemes). This approach was taken because the EPG scheme made up the majority of the transfer cost of the schemes (66%) and was the most novel of the schemes, given that it was a direct discount on the unit cost of energy bills. To create the two CBA figures, the evaluation team needed to apportion costs and benefits between the two set of schemes. However, the outputs for some of the methodologies, especially HIDEEM, were not directly divisible by scheme. This section sets out how this was done.

Costs

- The value of scheme transfers were derived from the values for each scheme, Table 3.2 above.
- Administrative costs were calculated for each set of schemes according to DESNZ financial reporting and closure reports for each scheme. Some of the costs for administering the AFP schemes are included under the EPG scheme because there were shared staffing and other costs between the two schemes. However, the inclusion of these costs under EPG has a minimal effect on the VfM assessments given the different scale of these two schemes.
- Time costs to the public were all allocated to the application-based schemes, i.e. not EPG.
- Environmental costs were derived using average daily consumption differences at the meter level in the Combined audit and NEED dataset (as set out in Section 3.1.4) modelled for EPG and other schemes separately.
- Fraud and error was apportioned by applying the NAO's estimate (0.07%) to the transfer payment value of each scheme.

[46] Costs per contacts for diseases are estimated using the National Cost Collection (NCC) data (2021/22) (NHS 2022) which includes services provided by the NHS in England. These costs include primary (limited to NCC data), secondary, emergency, and community care. Social care, full primary care and public health and prevention are not included.

Benefits

- Consumer surplus benefits for the EBSS and AFP schemes combined are calculated as the raw payments, e.g. for EBSS this was £400 in GB, for NI this was £600 for EBSS AFP, other values were as per scheme descriptions. Consumer surplus benefits for EPG are calculated as the total consumer surplus (recall Section 3.2.1) minus the value of payments for the other schemes.
- Health benefits due to avoided underheating: Total QALY value (mortality and morbidity) per year is estimated in the HIDEEM model. The HIDEEM model is calculated based on input data on the average 'rebate' amount per household. The model is not linear, meaning that it is not possible to model individual schemes separately as this would underestimate the impacts. Therefore, it was necessary to apply a proportionate split to the health impacts based on the relevant scheme. Given that the HIDEEM model is based on the 'rebate' amount, the proportionate split in the transfer cost of the schemes (66% EPG to 34% EBSS and others) was applied to the value of the benefits from the HIDEEM models.
- Total health savings (avoided resource cost) benefits: As above, applied the proportionate split in the transfer cost to the HIDEEM model outputs.

3.4. Sensitivity analysis and alternative approaches not used in calculations

Sensitivity analysis on inclusion of carbon costs in CBA

The analysis also calculated the VfM of the schemes if the environmental cost of carbon had not been included. Excluding carbon costs is more in keeping with the argument that these schemes merely sustained energy consumption at a level comparable to if the energy crisis had not occurred. The environmental impacts (carbon emissions and air pollution) analysed in comparison to an 'energy crisis without schemes' scenario would be substantially lower if assessed against a 'no energy crisis' counterfactual.

Excluding carbon costs from the CBA results in a Net Present Social Value of the energy affordability schemes over winter 2022/23 of £5.2bn. This equates to a social value Benefit Cost Ratio (BCR) of £17.13 for every pound spent. The Exchequer NPV and BCR remain unchanged from the main CBA.

Alternative methods considered: Cost of increased national debt and raising taxation

The CBA analysis also calculated the cost of increased national debt and taxation but this was not included in the main CBA calculations following discussions with DESNZ and HMT on applying Green Book guidance. In order to calculate this the team reviewed the OBR March 2020 Economic and Fiscal Outlook supplementary expenditure fiscal tables[47]. These

[47] OBR, March 2020. Economic and Fiscal Outlook supplementary expenditure fiscal tables 2020 to 2021.

suggested that in 2020 to 2021, increasing national debt by £5 billion would result in an extra debt servicing up until the next ‘fiscal event at a cost of £0.1 billion (2%). Applying this to the total cost of the schemes provided a figure of £72.5million.

Annex 4. Primary research with energy suppliers and other stakeholders

A small series of qualitative interviews (seven in total) were conducted to gather data on costs associated with administering the schemes along with overarching views on delivery of the schemes. This was separate to the earlier research with energy suppliers as part of the interim evaluations. These interviews were conducted with:

- Energy UK, the trade body for the energy industry (2 participants)
- UK energy Suppliers (5 participants)
- UK and Ireland Fuel Distributors Association, UKIFDA (1 participant)

An initial five supplier interviews were undertaken to try to better understand the administrative costs to suppliers. The interviews were held between January and February 2025 over Microsoft Teams and lasted one hour. The aim of these interviews was to collect accurate data on the costs borne by the energy suppliers to deliver the affordability schemes and also to understand suppliers' views on the overall impact of the schemes on households. In addition to qualitative interviews, suppliers were asked to estimate their administrative costs using self-completion cost sheets. This was introduced at the beginning of the interview and emailed to participants. Five suppliers were interviewed, however, only one was able to share a thorough quantified estimate of the costs associated with complying with the schemes by filling out the cost sheet.

4.1. Energy supplier and stakeholder discussion guides

4.1.1. Discussion guides for energy suppliers

Introduction

1. **Please can you tell me a bit about your role at [organisation name]?**

   a. *Day-to-day responsibilities*
   b. *Length of time in role*
   c. *Involvement in domestic energy affordability schemes (EBSS, EPG, AFP)*
   d. *Which schemes?*
   e. *Which processes? E.g. Scheme development, internal process setup, delivery, communication, reconciliation, etc.*

Scheme development

2. **Was [organisation name] involved in scheme development activities with DESNZ?**

   a. *Which schemes?*
   b. *What level of involvement?*

   c. *Number of staff involved, and seniority*
   d. *Estimate of days spent (all staff) and/or costs incurred in this stage*

3. **[*For those whose organisation was involved in this stage*] What benefits, if any, do you feel resulted from your involvement in scheme development activities?**

   a. *Do you feel that these benefits were appropriate to the costs/time you incurred in scheme development activities? Why/why not?*

4. **[*For those whose organisation was not involved in this stage*] Why were you not involved?**

   a. *Do you feel that you would have been able to commit resource to scheme development activities?*
   b. *What benefits, if any, do you think involvement in scheme development activities may have brought to your organisation?*

Scheme setup

5. **What processes were involved in scheme setup? (Ask for each scheme)**

   a. *Communication (internal and external)*
   b. *Software/system development*
   c. *Discount calculations*
   d. *Providing initial supplier setup information (details of senior officers and directors)*
   e. *Financial data provision (solvency statements, bank accounts, etc.)*

6. **For each of these processes, what costs did you incur?**

   a. *Number of staff involved, and seniority*
   b. *Estimate of days spent and/or costs incurred in this stage*

7. **Did you need to recruit any additional staff or employ external resource (e.g. contractors, consultants, etc.) to deliver any of these activities?**

   a. *If so, what was the cost of this?*

8. **Were you able to use, or adapt, existing systems to handle scheme management or did you need to procure new ones?**

   a. *If so, what was the cost of this?*
   b. *Are you still using the systems now the delivery phase has closed? Is there any lasting value?*

Scheme delivery

9. **What processes were involved in scheme delivery?**

   a. *Communication*
   b. *Customer service and complaints*
   c. *Payment and financial processes (with customers, and with DESNZ)*
   d. *Compliance, counter-fraud activity and reporting*
   e. *Addressing risks and problems*

10. **For each of these processes, what costs did you incur?**

    a. *Number of staff involved, and seniority*
    b. *Estimate of days spent and/or costs incurred in this stage*

11. **Did you need to recruit any additional staff or employ external resource (e.g. contractors, consultants, etc.) to deliver any of these activities?**

12. **Were you able to use, or adapt, existing systems to handle customer communication, customer service and complaints or did you need to procure new ones?**

13. **Did you experience a change in the volume of customer enquiries or complaints during the schemes' operation?**

    a. *How did this relate to business as usual? (Instruction for interviewer: business as usual refers to the period before April 2022).*
    b. *How did this relate to the start of the energy crisis before the schemes were launched? (Instructions for interviewer: this refer to the period April-October 2022).*
    c. *Was the nature of the enquiries/complaints different to usual? How much was specifically related to the scheme?*
    d. *Did this change over time?*

14. **How effective were the audit and assurance activities undertaken by DESNZ at reducing fraud and error?**

    a. *What was the administrative burden on your organisation from these activities?*
    b. *Do you feel the burden was proportionate to the risk?*

Scheme closure and reconciliation

15. **What processes were involved in scheme closure and reconciliation?**

    a. *Final reporting*
    b. *Payment and financial processes (with customers and with DESNZ)*
    c. *Reconciliation*
    d. *Offboarding*

16. **For each of these processes what worked well? What were the key challenges?**

    a. How did this vary across different schemes?

17. **For each of these processes, what costs did you incur?**

    a. *Number of staff involved, and seniority*
    b. *Estimate of days spent and/or costs incurred in this stage*

18. **Did you need to recruit any additional staff or employ external resource (e.g. contractors, consultants, etc.) to deliver any of these activities?**

General reflections and forward look

19. What were the impacts of the scheme in terms of:

a. Customer experience
b. Energy consumption
c. Customer debt and disconnections
d. Energy contracting
e. Energy saving behaviours

20. What benefits, if any, did the schemes provide your organisation?

21. Were there any unintended consequences of the schemes? If so, what?

a. For households
b. Energy suppliers
c. Energy market

22. Did the costs estimated by Ofgem, which formed the basis of the price differential between the default cap and the EPG cap, adequately reflect the cost differential your company faced? If not, what was the scale of difference?

23. Which elements, if any, cost you more than expected? Why?

24. Did your organisation experience any opportunity costs related to delivery of the schemes? E.g. through diverting resource away from other business areas?

a. *What was the nature of these?*
b. *Estimate of impact*

25. Were there any factors that facilitated your delivery of the schemes and helped reduce costs incurred through scheme involvement? If so, what? [Probe on:]

a. *Internal factors*

a. Existing resource/skills
b. Existing systems
i. Communications
ii. Finance systems
iii. Data management

b. *External factors*

a. Support from third parties
i. DESNZ/BEIS
ii. Ofgem
iii. Energy UK
iv. Other suppliers
b. Other

26. Do you feel that any of these factors would be of benefit if there were any future schemes? In what way?

27. **In the absence of the domestic energy affordability schemes, what costs do you think you may have experienced during the energy crisis?**

    a. *Probe on customer debt/non-payment*
    b. *How do you feel these costs would have compared to the costs incurred through your management of the schemes?*

28. **What would the likely trajectory of supplier insolvencies have been in the absence of the energy affordability schemes, taking into account other market factors and regulatory changes?**

    a. *Do you think the energy affordability schemes have reduced the risk of supplier insolvency? If so, to what extent?*

29. **Has your experience of the schemes resulted in any longer-term financial implications for your organisation? If so, what are they?**

    a. *How did the schemes affect your short-term and long-term cash flow, specifically regarding the timing of government payments, changes in customer payment patterns, and reductions in bad debt expenses?*
    b. *Were there any noticeable opportunity cost impacts from your involvement in the schemes?*

30. **Do you have any additional feedback on the costs your organisation incurred due to the scheme(s)?**

Close

31. **Any other final thoughts you would like to share with us?**

32. Thank participant and close

4.1.2. Discussion guides for Energy UK

Introduction

Please can you tell me a bit about your role at Energy UK?

- Day-to-day responsibilities
- Length of time in role
- Involvement in domestic energy affordability schemes (EBSS, EPG, AFP)
- Which schemes?
- Which processes? E.g. Scheme development, internal process setup, delivery, communication, reconciliation, etc.

Please can you tell me a bit about how Energy UK supported energy suppliers during the energy crisis?

- Dissemination of information/interpretation
- Advice and guidance
- Lobbying

Scheme development

To what extent do you feel that suppliers' views and perspectives were factored into scheme design? Why/why not?

- What were the impacts of this (positive and negative) on costs?
- Did this vary by scheme/NI?
- Did Energy UK support suppliers to contribute to scheme design? How?

Are you aware of any suppliers that were unable to engage in design/development activities? If so, please can you tell us about these cases? [Probe around:]

- Lack of resource to engage
- Timescales of design processes
- Did this vary by scheme/NI?

What further role could Energy UK have played in scheme design work? If so how and what benefits could this have brought?

Scheme setup

What, if any, feedback have your members provided around the setting up of scheme delivery processes and infrastructure? What worked well/less well?

- Communication (internal and external)
- Software/system development
- Discount calculations
- Did this vary by type/size of supplier?
- Did this vary by scheme/NI?

What, if any, feedback have your members provided regarding the costs experienced by suppliers during the setup stage?

- Can you estimate, or do you have figures for, the scale of costs incurred? Over what period?
- Were the costs appropriate to the need of the schemes?
- Were any processes more costly than others?

- Did suppliers need to recruit additional staff or employ external resource (e.g. contractors, consultants, etc.)
- Were they able to use, or adapt, existing systems to handle scheme management or did they need to procure new ones?
- Did this vary by type/size of supplier?
- Did this vary by scheme/NI?

[Note – if participant provides an estimate for the above, clarify what the estimate is based on, what it includes and how reliable they feel the estimate is]

Scheme delivery

What, if any, feedback have your members provided around scheme delivery processes? What worked well/less well?

- Communication
- Customer service and complaints
- Payment and financial processes
- Compliance and reporting
- Provision of data
- Addressing risks and problems

What, if any, feedback have your members provided regarding the costs experienced by suppliers during the delivery stage?

- Can you estimate, or do you have figures for, the scale of costs incurred? Over what period?
- Were the costs appropriate to the need of the schemes?
- Were any processes more costly than others?
- Were any processes costlier or more resource intensive than expected?
- Did suppliers need to recruit additional staff or employ external resource (e.g. contractors, consultants, etc.)
- Were they able to use, or adapt, existing systems to handle customer communication, customer service and complaints or did they need to procure new ones?
- Did they experience a change in the volume of customer enquiries or complaints during the schemes' operation?
- Did this vary by type/size of supplier?
- Did this vary by scheme/NI?

[Note – if participant provides an estimate for the above, clarify what the estimate is based on, what it includes and how reliable they feel the estimate is]

Scheme closure and reconciliation

What feedback have your members provided around scheme closure activities? What worked well/less well?

- Final reporting
- Payment and financial processes
- Reconciliation
- (If aware) Is this similar to experiences of suppliers related to the non-domestic schemes? (EBRS, EBDS)

What feedback have your members provided regarding the costs experienced by suppliers during the closure and reconciliation stage?

- Can you estimate, or do you have figures for, the scale of costs incurred? Over what period?
- Were the costs appropriate to the need of the schemes?
- Were any processes more costly than others?
- Did suppliers need to recruit additional staff or employ external resource (e.g. contractors, consultants, etc.)
- Did this vary by type/size of supplier?
- Did this vary by scheme/NI?

[Note – if participant provides an estimate for the above, clarify what the estimate is based on, what it includes and how reliable they feel the estimate is]

General reflections and forward look

Overall, what do you think worked well regarding the design and delivery of the schemes?

- How did this vary across different schemes?
- How did this vary between GB/NI?

What worked less well?

- How did this vary across different schemes?
- How did this vary between GB/NI?

Were there any factors external to the schemes and the wider energy market that impacted scheme delivery?

[If not already mentioned] What do you see as the advantages and disadvantages of a more targeted approach compared with the universal approach adopted by the schemes?

- Administrative burden/complexity

- Costs to suppliers
- Alternative delivery models – how would these have been delivered in practice?

What were the impacts of the scheme in terms of:

- Customer experience
- Energy consumption
- Customer debt and disconnections
- Energy contracting
- Energy saving behaviours

What benefits, if any, did the schemes provide to the energy market more broadly?

- Supplier liquidity
- Market stability allowing for longer term planning and investment

Were there any unintended consequences of the schemes? If so, what?

- For households
- Energy suppliers
- Energy market

Overall, do you feel that the costs experienced by suppliers were appropriate to the aims of the schemes?

- How did this vary across different schemes?
- How did this vary between GB/NI?

Which elements, if any, cost suppliers more than expected? Why?

Were there any factors that facilitated suppliers' delivery of the schemes and helped mitigate incurred costs? If so, what? [Probe on:]

- Internal factors:
- Existing resource/skills
- Existing systems
- Communications
- Finance systems
- Data management
- External factors:
- Support from third parties
- DESNZ/BEIS
- Ofgem

- Yourselves (Energy UK)
- Other suppliers
- Other

Do you feel that any of these factors would be of benefit if there were any future schemes? In what way?

In the absence of the domestic energy affordability schemes, what costs do you think suppliers may have experienced during the energy crisis?

- Probe on customer debt/non-payment
- How do you feel these costs would have compared to the costs incurred through your management of the schemes?
- How did the schemes affect suppliers' short-term and long-term cash flow, specifically regarding the timing of government payments, changes in customer payment patterns, and reductions in bad debt expenses?

What would the likely trajectory of supplier insolvencies have been in the absence of the energy affordability schemes, taking into account other market factors and regulatory changes?

- Do you think the energy affordability schemes have reduced the risk of supplier insolvency? If so, to what extent?
- What would have been the estimated economic consequences (e.g., market disruption, job losses, increased prices) if some suppliers had potentially become insolvent in the absence of the schemes?
- How did the impact of the energy affordability schemes on insolvency risk vary across different supplier types (e.g., by size, customer demographics, pre-existing financial health)?

Close

Any other final thoughts you would like to share with us?

4.1.3. Discussion guide for UKIFDA

Introduction

Please can you tell me a bit about your role at UKIFDA?

- Day-to-day responsibilities
- Length of time in role

What was the UKIFDA’s involvement, if any, in the domestic energy affordability schemes (AFP, AFP AF, EBSS AFP NI)?

- Which schemes and when?
- Which processes? E.g. Scheme development, data and receipting requirements, any other involvement?
- Probe whether UKIFDA members had any involvement in scheme delivery

Can you tell me some more about the changes in the heating oil market as prices increased in late 2021 and afterwards?

- What happened to fuel prices?
- What factors impacted that?
- How did the demand for heating oil change in GB?

Are you able to say more about the market in Northern Ireland?

- How did demand for heating oil change in NI, before and after the energy schemes were introduced in early 2023?
- Did your members notice changes in purchasing behaviour? What factors influenced this?

Please can you tell me a bit about how UKIFDA supported fuel suppliers and their customers during the energy crisis?

- Dissemination of information/interpretation
- Advice and guidance
- Anything else?

Scheme development

To what extent do you feel that fuel suppliers' views and perspectives were factored into the AFP schemes design? Why/why not?

- Did this vary by scheme/NI?

What further role could UKIFDA have played in scheme design work? If so how and what benefits could this have brought?

General reflections and forward look

Overall, what do you think worked well regarding the design and delivery of the schemes?

- How did this vary across different schemes?
- How did this vary between GB/NI?

What worked less well?

- How did this vary across different schemes?
- How did this vary between GB/NI?

- Are there any alternative scheme designs that you think may have worked?

How do you feel the timing and method of AFP payments worked in the context of how end users typically purchase fuel?

- How did this vary across customer types (e.g. those that buy in bulk, through an oil club, etc.)
- How did this vary between GB/NI?

[If not already mentioned] What do you see as the advantages and disadvantages of a more targeted approach compared with the universal approach adopted by other schemes (e.g. EBSS AFP in NI)?

- Administrative burden/complexity
- Costs to suppliers
- Alternative delivery models – how would these have been delivered in practice?

What were the impacts of the AFP schemes in terms of:

- Customer experience
- Energy consumption
- Customer debt
- Energy saving behaviours

In the absence of the domestic energy affordability schemes, what do you think the effects would have been on the alternative fuel market and fuel suppliers?

- Probe on customer demand
- How did the schemes affect suppliers' financial health/liquidity?
- Market stability e.g. allowing for longer term planning and investment

Were there any unintended consequences of the schemes? If so, what?

- For households
- Fuel suppliers
- Heating oil market generally

Overall, do you feel that the costs experienced by suppliers were appropriate to the aims of the schemes?

- How did this vary between GB/NI?

Is there any learning that would be of benefit if there were any future schemes? In what way?

Are there any lasting financial effects from the schemes on your members? If so, what?

Is there anything you would change about the schemes to better support your members or their customers?

Close

Any other final thoughts you would like to share with us?

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