UK Government

RAF032/2324: Evaluation of Industrial Energy Transformation Fund (IETF)

Annex C: Quantitative Benefits Analysis (QBA) Methodology

Department for Energy Security and Net Zero (2026)

Authors

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Views expressed in this report are those of Technopolis Group and Ricardo, and not necessarily those of the UK government.

Contents

Overview of QBA approach

As part of the overall CAPT framework for the IETF Interim Evaluation, a Quantitative Benefits Analysis (QBA) was performed to assess the programme's primary benefits, cost-effectiveness and the balance of primary costs and benefits. The outputs from the QBA are included as evidence for the mapped PT tests and triangulated as part of the integrated contribution analysis.

The main data source for the QBA is the IETF's monitoring and verification (M&V) reporting, complemented by insights from the qualitative fieldwork conducted as part of the Interim Evaluation to confirm and/or adjust the characterisation of the IETF's counterfactuals; that is, what could have occurred in the absence of IETF funding.

The scope of the QBA for the interim evaluation covers 21 projects from phases 1 and 2 for which M&V data is available. This represents around 13 per cent of all IETF projects funded under the programme.

The interim evaluation is expected to be supplemented with a programme-wide QBA (i.e. including all projects from phases 1, 2 and 3) during the final evaluation, which will add more comprehensive insights into the performance of the IETF across all phases and project types.

The rest of this document describes the objectives of the QBA, data sources and counterfactuals, and provides a methodological overview and a summary of findings against the pertinent evaluation questions. A list of projects included in the interim evaluation and a summary of their details is provided in Appendix 1. A detailed description of the methods and assumptions is provided in the Technical Appendix (Appendix 2).

QBA objectives

The QBA evidences the change in energy intensity, energy costs and carbon emissions within the IETF-funded portfolio of projects, when compared to the counterfactual. This evidence has been used to answer five evaluation questions (EQs):

- EQ8. How has the scheme reduced energy intensity, energy costs and carbon emissions for industry (EE objective)?
- EQ9. How has the scheme reduced energy intensity and carbon emissions for industry? (DD objective)
- EQ10. What was the overall carbon cost-effectiveness of the IETF (tCO2e/£)?
- EQ11. What was the overall BCR of the IETF?
- EQ12. To what extent has the IETF contributed to carbon budgets (especially 4 or 5) and the Net Zero 2050 target?

Project-level outcomes and impacts against their counterfactual were quantified and used as a measure of the IETF's direct contributions to reductions in energy intensity, energy costs and carbon emissions (EQ8 and EQ9) as well as the UK carbon budgets and Net Zero 2050 target (evaluation question 12). Counterfactual outcomes (i.e. without IETF) were estimated and, where needed, updated based on stakeholder consultations to capture the net impact of the fund based on the implementation so far. Importantly, the QBA only assessed the direct and primary benefits of the IETF beneficiaries. Impacts on the UK industry were captured only through this channel, and the analysis did not assess the scale of impacts within the IETF portfolio relative to overall industry-wide reductions.

Subsequently, the estimated primary benefits were complemented by an analysis of primary IETF costs to estimate the programme's carbon-cost effectiveness (CCE) (EQ10), benefit-cost ratio (BCR) (EQ11), as well as its contribution to UK carbon budgets (EQ12).

Data sources

Main sources

The MS Excel 'IETF Benefits Database', hosted by DESNZ, was the lead source of evidence for the QBA. This MS Excel workbook collates the main data required from all monitoring activity and reporting performed by beneficiaries. This includes data on the type, inputs, outputs and outcomes of each project:

- Type of project, e.g. energy efficiency (EE) or deep decarbonisation (DD)
- IETF grant amount (£)
- IETF total project costs (£)
- Project lifetime (years)
- DESNZ adjustment factors (e.g., additionality score, technical risk score, etc.)
- Direct carbon emissions savings (tCO_2e)
- Factors selected by DESNZ, including
  - Emission factors (tCO_2e/MWh)
  - Retail fuel prices (£/MWh)
  - Air quality damage factors (£/MWh)
- Production-adjusted counterfactual and actual fuel consumption, per fuel (in MWh)

Based on these data and/or evidence-based assumptions, the 'IETF Benefits Database' also calculates the primary benefits of each project, comprising:

- Reduction in fuel consumption (MWh)
- Carbon emissions savings (tCO_2e)
- Reduction in costs of fuel consumption (£)
- Reduction in air quality damage costs (£)

The latest six-monthly M&V reporting data was provided on 1 December 2025. This contained entries for the 21 projects (18 EE and 3 DD). Projects are listed in Appendix 1 with their key details.

The 'IETF Benefits Database' was complemented by a survey and interviews of beneficiaries to collect evidence regarding how projects would have changed their industrial processes and, as a result, fuel consumption in the absence of the IETF funding. These responses were used to adjust the counterfactual fuel consumption reported in the 'IETF Benefits Database'. This adjustment allows for the estimation of the net benefits of the IETF, compared with the confirmed counterfactual (see Counterfactual approach section for more details).

Other factors, such as the social cost of carbon (£/tCO2e)[1] used to monetise the reductions in carbon emissions reported in the 'IETF Benefits Database', were sourced from the UK Green Book[2].

Validation checks

Validation checks were performed to assure the completeness and consistency of the information reported. For each project, the dataset was considered complete if non-zero M&V data was available in the 'IETF Benefits Database', covering both the actual and counterfactual scenarios over the relevant time period. Data was considered consistent if it passed both internal and external consistency checks:

- The internal consistency check assesses whether the data is logically coherent within each project. This includes verifying alignment between the benefit values in the 'IETF Benefits Database', and the methodology and data provided at the time of application, that emission and conversion factors have been correctly applied, and that time series follows an explainable trend.
- The external consistency check compares the reported data with data from other projects as well as relevant literature or other authoritative sources. This included verifying that fuel prices are consistent across comparable projects and aligned with external benchmarks or reference values.
- During these consistency checks, it was noted that some projects reported negative benefits (e.g., actual fuel consumption exceeded counterfactual levels). As projects would typically be expected to generate positive benefits, they were investigated to determine the reasons for the observed negative benefits. It was found that the projects, indeed, did not achieve the expected benefits due to disturbances like temporary or permanent plant shutdowns, significant reductions in production volumes, or instances where installed technologies did not perform as originally intended. Therefore, the estimated negative benefits were retained as part of the QBA to transparently capture these real-world delivery risks and operational uncertainties. Additional detail is provided in the Technical Appendix (Appendix 2).

[1] Carbon values are taken from DESNZ (2012) 'Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal'. The guidance is accompanied by an Excel workbook (Data tables 1 to 19: supporting the toolkit and the guidance), from which Table 3: Carbon values and sensitivities 2010–2100, expressed in 2022 £/tCO_2e was used. This table provides low, central and high values for carbon emissions.
[2] HM Treasury (2026) 'The Green Book and accompanying guidance'

Counterfactual approach

The counterfactual refers to a scenario absent of the IETF and serves as a benchmark against which to compare IETF outcomes. Characterising the counterfactual effectively is a core part of the QBA.

Counterfactual outcomes were submitted by project administrators as part of the M&V data and captured in the 'IETF Benefits Database'. As part of this interim evaluation, these were updated based on stakeholder consultations and survey results to capture the net impact of the fund.

More specifically, the reported counterfactual fuel consumption in the 'IETF Benefits Database' is drawn from the baseline or 'pre-IETF' processes and indicates the fuel consumption that each beneficiary would make in the absence of IETF funding, over a similar time period. However, pre-IETF fuel consumption might not always be an accurate representation of the counterfactual scenario. For example, IETF beneficiaries could have already been considering investments in alternative industrial processes ahead of exploring IETF support and could have still transformed these processes in the absence of said support in some way. There is a risk that the original, unadjusted 'pre-IETF' counterfactuals overstate the energy consumption and emissions reductions that could have occurred without the IETF support.

These risks were investigated through consultation activities with beneficiaries, and corrections were introduced where necessary. Evidence was gathered from surveys and interviews with IETF beneficiaries, this was analysed and reviewed, and the results or insights were used to review the pre-IETF 'counterfactuals' and develop adjustment factors based on the typology of projects (i.e. EE or DD)[3]. These adjustment factors were applied to the counterfactuals reported by projects in the 'IETF Benefits Database' to obtain a scaled down 'adjusted counterfactual' timeseries for each project which represents the net impacts attributable to the IETF. These adjusted counterfactuals were then compared against the actual 'outturn' data reported in the 'IETF Benefits Database' to calculate the net benefit of the IETF.

[3] These counterfactual adjustment factors are derived from a small sample of survey and interview responses from IETF beneficiaries at this interim stage.

The resulting adjusted counterfactual was then compared with actual observed energy consumption. An overall adjustment factor was also applied to the difference between the actual and adjusted counterfactual energy consumptions. This factor, sourced from the 'IETF Benefits Database' without any modification, reflects DESNZ's assessment (as documented in the IETF business case) of each project across a range of parameters, including rebound rate, overall risk, fuel impact technical risk, shutdown risk, and additionality.[4] The result yields the net adjusted reduction in energy consumption at project level, noting that the combination of the counterfactual adjustment factor and the DESNZ adjustment factor provide a conservative estimate of the reduction in energy consumption that could be attributed to the IETF support.

The Technical Appendix (Appendix 2) provides further details regarding the methodology for determining counterfactuals.

Monetising (marginal) benefits using the adjusted counterfactuals

For each project, three monetised benefits were calculated using the benefits estimated in the 'IETF Benefits Database' and the net reduction in energy consumption (against the adjusted counterfactual):

- **Net reduction in energy costs**, estimated using fuel-specific retail prices (£/MWh) in the 'IETF Benefits Database', and adjusted using the net reductions in energy consumption derived from the adjusted counterfactual.
- **Monetised net reduction in carbon emissions**, estimated using fuel-specific emissions factors (tCO_2e/MWh) in the 'IETF Benefits Database', and adjusted using the net reductions in energy consumption derived from the adjusted counterfactual. Where projects reported direct emissions reductions not mediated through reduced energy consumption, these were included as reported. Since carbon emissions are not monetised in the 'IETF Benefits Database', these were monetised using carbon values from the UK Green Book supplementary guidance (£/tCO_2e).[5]
- **Net reduction in air quality damage costs**, estimated using fuel-specific air quality damage factors (£/MWh) in the 'IETF Benefits Database', and adjusted using the net reductions in energy consumption derived from the adjusted counterfactual.

[4] Assessors of IETF applications score each project on a scale of 1-10 on each parameter (aside from shutdown risk, which receives a common score across projects). These scores are multiplied together and applied as an adjustment to scale down the reported benefit to reflect the net benefit that can be attributed to IETF funding. For example, the additionality score reflects the extent to which a project delivers additional benefits above what would have occurred in the absence of IETF funding. Similarly, the fuel impact technical risk score reflects the extent to which, once the kit has been installed, and assuming that the site does not shut down throughout the lifetime of the asset, the fuel savings actually achieved by the project are not as high as claimed in the application over the proposed asset lifetime. The technical risk factor and shutdown risk factor account for the likelihood that not all the benefits will be realised, whereas rebound factor adjusts the benefits downwards for the expected increase in production due to savings made in the energy consumption.

[5] HM Treasury (2026) 'The Green Book and accompanying guidance'

Evaluation question findings

The QBA seeks to answer evaluation questions 8-12. Each question is analysed below, with a stated method, results, and discussion. More nuanced detail on the technical modelling approach, including assumptions and limitations can be found in the Technical Appendix (Appendix 2).

EQ8: How has the scheme reduced energy intensity, energy costs and carbon emissions for industry (EE objective)?

Method

The impacts of the IETF on energy intensity, energy costs and carbon emissions for EE projects were assessed using a bottom-up, project-level approach based on M&V data reported in the 'IETF Benefits Database'. A total of 18 EE projects reported data for the interim evaluation.

For each EE project and each year of the evaluation period, two data series were sourced from the M&V data reported by the project in the 'IETF Benefits Database': the actual observed energy consumption and an ex-ante, production-adjusted counterfactual. This counterfactual represents a business-as-usual (i.e. 'without-IETF project') scenario based on production processes and operating practices in place prior to project implementation. The counterfactual is production-adjusted to account for observed changes in output over time, ensuring that the counterfactual consumption corresponds to the level of energy consumption that would have been expected for the same level of production as the actual, realised level of production.

As noted in the Counterfactual approach section above, before comparison with actual consumption, the ex-ante, production-adjusted counterfactual was subject to an additional adjustment to reflect the energy-saving activities that beneficiaries would still have undertaken in the absence of the IETF. This adjustment estimates the share of energy consumption reductions attributable to IETF support by accounting for the extent to which beneficiaries reported that similar reductions could have been achieved in the absence of the programme.

Given the variation in responses, three counterfactual estimates were defined based on the consultation evidence: a central 'medium' estimate reflecting the most likely behavioural response reported by beneficiaries, alongside 'low' and 'high' estimates representing more conservative and more optimistic assumptions regarding the extent of reductions that could have occurred without IETF funding. These estimates were tested as part of the sensitivity analysis in the Technical Appendix (Appendix 2). Further details on the derivation of these estimates are also provided in the Technical Appendix (Appendix 2).

Reductions in energy costs, air quality damages, and carbon emissions were sourced directly from the 'IETF Benefits Database' and scaled proportionally based on the counterfactual adjustment (see Counterfactual approach section), thereby aligning the monetised impacts with the net energy savings attributable to IETF support. The fuel prices (£/MWh) and fuel-specific emissions factors (tCO2e/MWh) chosen by DESNZ in the 'IETF Benefits Database' were reviewed and retained without any modification to align with DESNZ's assessment of the project benefits. In addition, where projects reported direct emissions reductions (i.e. emissions reductions not mediated through reduced energy consumption), these were taken as reported and included without further adjustment.

Observed energy consumption data from the M&V dataset is available up to 2025. For the remainder of the project lifetime within the evaluation period (i.e. 2026–2050), annual net reductions in consumption were projected by holding the last observed annual reduction constant. The amount of extrapolated datapoints varied by project, as individual projects had distinct start years (e.g. 2021-2024), and project lifetimes (e.g. 15-30+ years).

Further details on this methodology are provided in the Technical Appendix (Appendix 2).

Results

Table 1 below summarises cumulative impacts across the EE portfolio under the 'medium' sensitivity, which represents the most likely estimates. Impacts are calculated at project level and aggregated across all years of the evaluation period. Reported values therefore represent total EE portfolio-level impacts over the appraisal period.

Table 1: Estimated benefits for 18 Energy Efficiency (EE) projects (Medium sensitivity)

Benefit	Value in units
Net reduction in energy consumption (GWh)	445 GWh
Net reduction in energy costs (million £, 2025£)	£135 million
Net reduction in carbon emissions (tCO_2e)	103,500 tCO_2e

Discussion

Overall, the 18 EE projects within the IETF scheme are estimated to reduce energy intensity (measured in terms of reduction in production-adjusted energy consumption) by around 445 GWh between 2021-2050, which corresponds to a 1.5% reduction against the adjusted counterfactual levels of fuel consumption. This results in reduced energy costs of around £135 million (in 2025£) and over 103,500 tCO_2e of carbon emissions saved over the evaluation period of 2021-2050. The direction and magnitude of impacts is driven by two large projects, one of which generates large increases in energy consumption and emissions that are outweighed by the reductions in energy consumption and emissions of the other project in the 'medium' sensitivity results presented above.

The sensitivity analysis shows that the overall reduction in energy consumption, energy costs, and emissions is maintained only in the ‘high’ sensitivity scenario, where EE projects are estimated to deliver reductions across all three metrics.

In the ‘low’ sensitivity scenario, total energy consumption and carbon emissions are estimated to increase. This outcome is driven by a single project with disproportionately large increases in energy use and emissions, which more than offset the reductions achieved by the remaining projects in the EE portfolio. Despite this, energy costs are still estimated to decrease in the ‘low’ sensitivity scenario, reflecting a substantial cost reduction from one project that outweighs the impact of higher energy consumption elsewhere in the portfolio.

These results highlight the heterogeneous performance of projects within the portfolio and associated delivery risks. Further details of the sensitivity analysis are provided in Appendix 2.

EQ9: How has the scheme reduced energy intensity and carbon emissions for industry? (DD objective)

Method

The impacts of the IETF on energy intensity, energy costs and carbon emissions for DD projects were assessed using the same bottom-up, project-level approach and methodological framework described under EQ8, drawing on data reported in the ‘IETF Benefits Database’. A total of 3 DD projects reported data for the interim evaluation. A detailed description of the methodology is provided in the Technical Appendix (Appendix 2).

Similarly to EE projects, primary impacts were estimated by comparing the actual observed energy consumption against the adjusted counterfactual, with net reductions in energy consumption subsequently used to derive the adjusted energy cost savings and carbon emissions reductions. All adjustments, projections to 2050, and aggregation procedures were applied consistently with the approach described in EQ8.

Results

Table 2 below summarises cumulative impacts across the DD portfolio (N=3) under the ‘medium’ sensitivity, which represents the most likely estimates. Impacts are calculated at project level and aggregated across all years of the evaluation period. Reported values therefore represent total DD portfolio-level impacts.

Table 2: Estimated benefits for 3 Deep Decarbonisation (DD) projects (Medium sensitivity)

Benefit	Value in units
Net reduction in energy consumption (GWh)	25 GWh
Net reduction in energy costs (million £, 2025£)	£1.4 million
Net reduction in carbon emissions (tCO_2e)	1,400 tCO_2e

Discussion

Overall, the 3 DD projects within the IETF scheme are estimated to reduce energy intensity (measured in terms of reduction in production-adjusted energy consumption) by around 25 GWh between 2021-2050. This corresponds to a 56 per cent reduction against the adjusted counterfactual levels of fuel consumption, generating carbon emission savings of around 1,400 tCO_2e.

The sensitivity analysis shows that DD projects are estimated to generate reductions in energy consumption and carbon emissions across all sensitivity scenarios, meaning the results are robust and stable despite limitations. In particular, the results are limited by the small sample and relatively early-stage nature of the DD projects. Further details of the sensitivity analysis are provided in Appendix 2.

EQ10: What was the overall carbon cost-effectiveness of the IETF (tCO2e/£)?

Method

In this case, carbon cost-effectiveness (CCE) is defined as the emissions savings per £ of money invested in the IETF. The CCE (measured in $kgCO_2e$/£) was estimated as the ratio between the net reduction in carbon emissions attributable to the IETF, and programme costs over the evaluation period 2021-2050. This approach enables comparison of the IETF with other emissions or energy focused policy programmes on a like-for-like basis.

To allow for a like-for-like comparison to other government initiatives, these programme costs did not include costs of administrating the programme (incurred by both DESNZ and the project owners), including costs associated with unsuccessful or withdrawn applications. These wider costs to government of administering the IETF (and associated value for money) could be considered as part of the final evaluation. Further discussion of this assumption is provided in the Technical Appendix (Appendix 2).

As described in EQ8, the reduction in carbon emissions was sourced directly from the 'IETF Benefits Database', wherein the reduction in energy consumption was converted into carbon emissions reductions using fuel-specific emissions factors (tCO_2e/MWh). This was adjusted based on findings from the consultation (see Counterfactual approach section). For projects reporting direct emissions reductions not driven by reduced fuel consumption, these were included as reported. The annual emissions reductions were aggregated at project level and projected across the evaluation period to obtain an estimated reduction in carbon emissions attributable to the IETF. These figures, presented in EQ8 and EQ9, form the numerator of the CCE calculation. The Technical Appendix (Appendix 2) provides further details on the estimation of emission reductions.

Two alternative definitions of programme costs were considered to derive different estimates of cost effectiveness:

- **IETF grant amount**, reflecting direct public expenditure under the programme. This was used to derive the cost effectiveness per £ of IETF grant amount.
- **Total project cost**, defined as the sum of IETF grant funding and beneficiary self-financed contributions, reflecting the full investment associated with delivering the emissions reductions. This was used to derive the cost effectiveness per £ of total project expenditure.

These cost measures were sourced from the 'IETF Benefits Database'. These form the denominator of the CCE calculation. Multiple cost categories (administrative costs for successful/unsuccessful applications, counterfactual project capex/opex, as well as terminal values of equipment) are not captured in the interim evaluation and thus do not form part of the CCE calculation. This limitation is discussed further in the Technical Appendix (Appendix 2).

Results

The CCE was calculated by dividing the net reduction in carbon emissions by the relevant cost indicator – ITF grant amount or total project cost. Results are reported both for EE and DD projects and the complete portfolio in Tables 3 and 4 below.

Table 3: CCE per £ of IETF grant amount (Medium sensitivity)

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in carbon emissions (tCO2e)	103,500 tCO2e	1,400 tCO2e	104,900 tCO2e
Total IETF grant (million £, 2025£)	£18 million	£1 million	£19 million
£/tCO2e reduced (total IETF grant, 2025£)	£171/tCO2e	£707/tCO2e	£178/tCO2e
CCE per £ of IETF grant (kgCO2e/£)	**5.8 kgCO2e/£**	**1.4 kgCO2e/£**	**5.6 kgCO2e/£**

Table 4: CCE per £ of total project cost (Medium sensitivity)

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in carbon emissions (tCO2e)	103,500 tCO2e	1,400 tCO2e	104,900 tCO2e
Total project costs (2025£)	£53 million	£2 million	£55 million
£/tCO2e reduced (total project costs, 2025£)	£512/tCO2e	£1,223/tCO2e	£521/tCO2e
CCE per £ of total project cost (kgCO2e/£)	**2.0 kgCO2e/£**	**0.8 kgCO2e/£**	**1.9 kgCO2e/£**

Discussion

Overall, the IETF projects are estimated to abate 5.6 kgCO_2e per £ of grant support they receive and 1.9 kgCO_2e per £ spent overall. Specifically, EE projects deliver emissions reductions of 5.8 kgCO_2e per £ of the IETF grant amount and 2.0 kgCO_2e per £ spent overall. DD projects deliver slightly lower emissions reductions of 1.4 kgCO_2e per £ of the IETF grant amount of 0.8 kgCO_2e per £ spent overall.

Looking at the results in £/tCO_2e units allows for comparing the IETF's performance with the UK Green Book's benchmark carbon values. The central Green Book value for 2025[6] is £313/tCO_2e (in 2025£), representing the economic benefit to society of avoiding one tonne of emissions. Based on the public grant contribution alone, the abatement cost for the IETF is estimated at £178/tCO_2e, well below the benchmark carbon value.

However, projects supported through the IETF rely heavily on private co-investment, and would not be delivered without this additional funding, which is included in the total project costs. Based on this measure, the IETF's abatement cost is estimated at £521/tCO_2e, which is higher than the benchmark carbon value.

These results are largely driven by EE projects, which make up most of the projects included in the interim evaluation. For DD projects, the estimated abatement costs exceed the benchmark carbon values when considering both the IETF grant and the total project cost. This reflects the capital-intensive nature of the IETF portfolio, particularly for DD projects.

[6] HM Treasury (2026) 'The Green Book and accompanying guidance'

Overall, the lower grant-based abatement cost shows that grant funding under the IETF is helping to unlock much larger private investment, allowing emissions to be reduced for much less public money than the economic benefit generated by the abatement. This demonstrates strong value for money from a taxpayer perspective.

Sensitivity analysis results show that the IETF portfolio continues to have a positive CCE in the 'high' sensitivity scenario but becomes negative in the 'low' sensitivity scenario. This outcome is driven primarily by one EE project in the 'IETF Benefits Database' reporting very large increases in emissions relative to its counterfactual, which are further amplified by the counterfactual adjustments applied in the 'low' sensitivity scenario. As a result, the negative impact of this single project is large enough to offset the emissions reductions achieved across the rest of the portfolio. Further details of the sensitivity analysis are provided in Appendix 2.

EQ11: What was the overall BCR of the IETF?

Method

As part of the QBA, a cost-benefit analysis (CBA) was conducted to assess the primary costs and benefits associated with the IETF, and estimate the BCR, which measures the extent to which the monetised benefits generated by the IETF exceed the programme costs over the evaluation period. The BCR was estimated as the ratio between the net present value (NPV) of monetised benefits attributable to the IETF, and the NPV of programme costs over the evaluation period 2021–2050, with both costs and benefits discounted (using a factor of 3.5% for all costs and benefits except reductions in air quality damages, which were discounted using the health factor of 1.5%[7]) in line with the Green Book.[8]

Total project costs (i.e., the sum of the IETF grant amount and self-financed project costs) reflect the societal investment associated with delivering energy and emissions reductions of IETF-funded projects. Ideally, these costs would be compared with the investment that beneficiaries would have incurred under the counterfactual ('without-IETF') scenario; for example, if firms would have implemented smaller or cheaper projects on their own. However, there is insufficient evidence to estimate these counterfactual investment costs. As a result, the analysis used the full observed project costs without deducting any investment that beneficiaries might have undertaken independently. This makes the denominator of the BCR larger than would have otherwise been the case, lowering the BCR result. The resulting BCR should thus be interpreted as conservative, as the programme's value for money may actually be higher than the estimate suggests. This cost measure was used to estimate the BCR of the IETF. Additional discussion about this can be found in the Technical Appendix (Appendix 2).

As described in EQ8, the carbon emissions, reductions in energy costs and air quality damage costs were sourced directly from the 'IETF Benefits Database' and scaled proportionally based on the counterfactual adjustment. This scaling ensures that the benefits represent the net reductions attributable to the IETF against a realistic counterfactual scenario where the projects would still have taken some action to reduce their fuel consumption in the absence of IETF funding. All benefit estimates take account of the relevant fuel mix by applying fuel-specific energy prices, emissions factors and air quality damage factors, as appropriate for the

[7] Defra (2025) 'Air quality appraisal: damage cost guidance'
[8] HM Treasury (2026) 'The Green Book and accompanying guidance'

project's fuel mix. Further detail on how net reductions in energy consumption were derived is provided in EQ8.

The three monetised benefit components (net reduction in energy costs, net reduction in carbon emissions, and net reduction in air quality damage costs), were aggregated at project level and across the evaluation period to derive total monetised benefits at project level, forming the numerator of the BCRs. Further details are provided in the Technical Appendix (Appendix 2).

Results

The NPV of monetised benefits, disaggregated by benefit and project categories is presented in Table 5 below. EE projects deliver the bulk of monetised benefits, largely through energy cost savings and carbon emissions reductions. DD projects generate much lower monetised benefits overall, but with a relatively higher share attributable to air quality damage cost reductions compared with EE projects.

Table 5: NPV of estimated, monetised benefits, discounted to 2021 (Medium sensitivity)

Monetised benefit (million £, 2025£)	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in energy costs	£92 million	£1 million	£93 million
Monetised net reduction in carbon emissions	£27 million	£0.3 million	£27 million
Net reduction in air quality damage costs	£0.4 million	£0.7 million	£1 million
Total project benefits	£118 million	£2 million	£120 million

The NPV of full project costs (as proxy for the primary costs of the IETF intervention from a social perspective) was estimated and presented by project category in Table 6 below. In addition, the BCR was calculated by dividing the NPV of total project benefits by the NPV of total project costs. A BCR greater than 1 indicates that the expected benefits from an investment outweigh the costs, suggesting that the project is socially profitable over the evaluation period. BCRs are reported both separately and combined separately for EE and DD projects, in Table 6 below.

Table 6: NPV of costs and benefits (discounted to 2021) and BCR based on total project costs (Medium sensitivity)

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Total project benefits (million £, 2025£, NPV)	£118 million	£2 million	£120 million
Total project costs (million £, 2025£, NPV)	£45 million	£1.5 million	£47 million
BCR	**2.6**	**1.5**	**2.6**

Discussion

Overall, the results demonstrate that the 21 IETF projects captured in the interim evaluation are estimated to deliver a net benefit to society, with a BCR of 2.6 overall. That is, for every £1 spent, a benefit of £2.60 is generated. This implies that net societal benefits attributable to the IETF (in terms of reduced energy consumption and carbon emissions and improvements in air quality) exceed the total investments (public and private) under the IETF. Due to the large number of EE projects reporting data for the interim evaluation (i.e. 18 out of 21), the combined BCRs largely reflect the EE outcomes.

The results presented in Table 7 below also demonstrate a positive return on public sector costs (RPSC), as the ratio of the total project benefits (net of non-public sector costs) to the IETF grant amount is estimated at 5.6, that is, £5.60 of benefits generated per £1 of public spending (see Technical Appendix (Appendix 2)). This is slightly lower, but comparable, to the net benefit of £6.50 per £1 of public spending that was estimated within DESNZ's original Full Business Case (FBC). Importantly, FBC forecast results are based on all projects (not just the 13 per cent reporting data at time of the interim evaluation). Comparison between FBC estimates and IETF outcomes will form a key part of the final evaluation.

Table 7: NPV of costs and benefits (discounted to 2021) and RPSC based on total public sector costs i.e., IETF grant (Medium sensitivity)

Indicator	EE projects	DD projects	All projects
Projects included in analysis	18	3	21
Total project benefits (million £, 2025£, NPV)	£118 million	£2 million	£120 million
Total public sector costs (million £, 2025£, NPV)	£15 million	£1 million	£16 million

Indicator	EE projects	DD projects	All projects
Total project costs (million £, 2025£, NPV)	£45 million	£1.5 million	£47 million
RPSC	**5.8**	**1.8**	**5.6**

Sensitivity analysis results show that the BCR of the IETF, as implemented to date, exceeds 1.0 in the 'medium' and 'high' scenarios. In the 'low' scenario, the BCR falls below 1.0 due to a single project with very large negative benefits, which outweighs the positive benefits generated by the rest of the portfolio. In practice, this outcome is considered highly unlikely. Further details of the sensitivity analysis are provided in Appendix 2.

Overall, the analysis suggests that the IETF programme has likely achieved a BCR greater than 1, meaning that the benefits to society are estimated to outweigh the costs incurred.

EQ12: To what extent has the IETF contributed to carbon budgets (especially 4 or 5) and the Net Zero 2050 target?

Method

Following discussions with DESNZ, the focus at the interim evaluation stage has been placed on the IETF's contribution to the UK's Net Zero 2050 target, rather than on its direct contribution to individual Carbon Budgets (CBs). This is because the expected effects of existing and planned industrial decarbonisation policies (including a substantial share of the IETF portfolio) are embedded within the baseline emissions projections used to determine the IETF contribution to the CBs. The methodological approach required to address this issue, should it be considered in a future evaluation, is set out in in the Technical Appendix (Appendix 2).

The assessment of the IETF's contribution to the Net Zero 2050 target adopts a long-term perspective, estimated as the ratio between the cumulative lifetime emissions reductions attributable to IETF-funded projects to 2050, and the total cumulative emissions reductions required for the UK to achieve Net Zero by 2050 over the same period.

The numerator corresponds to the total emissions reductions attributable to the IETF over the evaluation period to 2050. This is estimated at 104,900 tCO2e as shown in both Table 3 and Table 4 as part of EQ10.

The denominator (i.e. the cumulative decarbonisation pathway to 2050) is represented using a simple benchmark in which UK greenhouse gas emissions are assumed to decline steadily from their 2023 level, based on the most recent official figures published in the UK government's Final Greenhouse Gas Emissions Statistics (table 1.1), to reach zero emissions in 2050.

Under this linear reduction pathway, the implied cumulative emissions over the period 2021-2050 amount to 6,200 $MtCO_2e$. This figure reflects the total amount of emissions implied by this gradual decline over the period 2021-2050 and is used to illustrate the overall scale of emissions reductions associated with achieving Net Zero.

Results

The analysis estimates that IETF-funded projects captured in the interim evaluation (N=21) will deliver cumulative emissions reductions of 0.1049 $MtCO_2e$ over the period 2021-2050. When expressed cumulatively and compared with the emissions reductions required to achieve the UK's Net Zero 2050 target over the same period (i.e. 6,200 $MtCO_2e$), the IETF contribution represents 0.0017% of the overall decarbonisation pathway. These results are presented in Table 8 below.

Table 8: IETF contribution to the Net Zero 2050 target (Medium sensitivity)

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in carbon emissions (tCO2e)	103,500 tCO2e	1,400 tCO2e	104,900 tCO2e
Net reduction in carbon emissions required to achieve Net Zero (MtCO2e)	6,200 $MtCO_2e$	6,200 $MtCO_2e$	6,200 $MtCO_2e$
IETF contribution (%)	**0.001665%**	**0.000023%**	**0.001687%**

Discussion

The results indicate that the 21 projects funded by the IETF that are captured under this interim evaluation will make a positive and direct, yet limited contribution to the UK's Net Zero 2050 target. While the absolute scale of the contribution is modest relative to the total emissions reductions required economy-wide, its significance lies in enabling decarbonisation of hard-to-abate sectors and where early deployment (and subsequent learning) from low-carbon technologies is critical.

The estimated long-term contribution of the IETF should be interpreted as indicative of its direct impact, rather than as an assessment of its system-wide impact. The true overall contribution could plausibly be higher or lower than the central estimate, depending on the extent to which spillover, rebound, or displacement effects materialise (see Technical Appendix for further detail).

Overall, the findings support the conclusion that the IETF plays a small, targeted, and additional role in the UK's long-term decarbonisation pathway, complementing other policies and contributing to the achievement of the Net Zero 2050 target.

Appendix 1: Projects included in the interim evaluation

The IETF is comprised of three phases, each consisting of multiple competition funding rounds. Table A1 details the 21 projects that were reporting M&V data at time of interim evaluation for analysis (as of 1 December 2025), as documented in the 'IETF Benefits Database'[9].

Table A1. Projects in scope for IETF interim evaluation

#	Phase	Project. No.	Lead organisation	Project type	Start date	Lifetime (years)	IETF grant (2021£)
1	P1.1	95703	SAINT-GOBAIN GLASS (UNITED KINGDOM) LIMITED	Energy Efficiency	01-Oct-21	20	£1,428,015
2	P1.1	96515	ENCIRC LIMITED	Energy Efficiency	01-Jul-23	30	£2,513,839
3	P1.1	97009	ROCKWOOL LIMITED	Energy Efficiency	04-Jan-23	25	£273,504
4	P1.1	97426	CELSA MANUFACTURING (UK) LIMITED (SVC)	Energy Efficiency	01-Apr-24	30	£3,000,000
5	P1.1	97750	SAMWORTH BROTHERS LIMITED	Energy Efficiency	01-Jan-25	15	£549,210
6	P1.1	97831	SOFIDEL UK LIMITED	Energy Efficiency	01-Dec-22	30	£675,000
7	P1.1	98501	MAGNAVALE LTD (Scunthorpe)	Energy Efficiency	03-May-22	24	£250,463
8	P1.1	98511	MAGNAVALE LTD (Warrington)	Energy Efficiency	10-Mar-23	25	£250,101
9	P1.2	3508	FP MCCANN LIMITED	Energy Efficiency	09-Jan-24	40	£3,399,393

[9] Further details on IETF competition winners, including project descriptions, are publicly available at: DESNZ (2026) 'IETF Phase 3, Spring 2024: competition winners'

#	Phase	Project. No.	Lead organisation	Project type	Start date	Lifetime (years)	IETF grant (2021£)
10	P1.2	14772	NGF EUROPE LIMITED	Energy Efficiency	01-Jan-24	20	£150,500
11	P1.2	15274	GOODWIN INTERNATIONAL LIMITED	Energy Efficiency	06-Jan-24	20	£125,156
12	P1.2	15690	BASELL POLYOLEFINS UK LIMITED	Energy Efficiency	01-Jan-24	15	£120,424
13	P1.2	15890	DUNBIA (UK)	Energy Efficiency	07-Apr-25	15	£1,092,600
14	P2.1	21002	WIENERBERGER LTD	Deep Decarbonisation	01-Nov-23	15	£220,299
15	P2.1	21006A	TOYOTA MOTOR MANUFACTURING (UK) LIMITED	Energy Efficiency	01-Jan-24	15	£667,800
16	P2.1	21015	ROCK CHEMICALS LIMITED T/A ROCK OIL	Energy Efficiency	01-Mar-23	20	£100,552
17	P2.1	21032	NATURAL WORLD PRODUCTS	Deep Decarbonisation	01-Jan-24	10	£299,409
18	P2.3	23046C	PLASTIPAK U.K., LTD.	Energy Efficiency	04-Jan-25	20	£7,535
19	P2.3	23046D	PLASTIPAK U.K., LTD.	Energy Efficiency	04-Jan-25	20	£23,128
20	P2.3	23046E	PLASTIPAK U.K., LTD.	Energy Efficiency	04-Jan-25	20	£21,750
21	P2.4	24003	ReCon Waste Management	Deep Decarbonisation	03-Jan-25	10	£283,104

Appendix 2: Technical Appendix

This section describes the methods, assumptions and limitations underlying the analysis of costs and benefits and the CBA.

CBA approach

A CBA model was designed to assess the costs, benefits, BCR and CCE of the IETF by drawing upon inputs from various sources to answer evaluation questions 8-12. The scope of the model was limited to the 21 projects from phases 1 and 2 (18 EE and 3 DD) which had begun submitting M&V data at the time of the interim impact evaluation (as of 1 December 2025).

The model was constructed using three data sources: (1) the 'IETF Benefits Database', which served as the main source of project costs and quantitative benefits data from the M&V returns submitted by the projects; (2) qualitative insights from the beneficiary survey and interviews, which were used to develop counterfactual adjustment factors; and (3) UK Green Book guidance[10], including the discount rates and carbon values[11].

The counterfactual adjustment factors were used to estimate the adjusted counterfactual fuel consumption, which was then compared against the actual fuel consumption to develop estimates of the net benefits attributable to the IETF and the carbon cost effectiveness (CCE) of the scheme. The model also discounted these costs and benefits to estimate their Net Present Value (NPV) and obtain the benefit-cost ratio (BCR) of the scheme. A detailed methodology is provided in the subsequent sections.

The analysis was conducted for both EE and DD projects; however, a phase-level disaggregation was not undertaken. This reflected two considerations: (1) DD projects were only represented in Phase 2, such that any comparison by phase would be confounded with project typology; (2) deriving phase-specific counterfactual adjustment factors was not feasible on a robust basis for Phase 1. Phase-level analysis could be considered in the final evaluation, where the larger number of projects reporting M&V data will provide a more robust evidence base for comparisons across funding phases. This is further discussed in the Adjustments to counterfactuals section.

This CBA model will also serve as the basis for the final impact evaluation and should be further refined in the final evaluation using the expanded set of M&V inputs from all deployment projects from phases 1, 2 and 3.

[10] HM Treasury (2026) 'The Green Book and accompanying guidance'

[11] Carbon values are taken from DESNZ (2012) 'Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal'. The guidance is accompanied by an Excel workbook (Data tables 1 to 19: supporting the toolkit and the guidance), from which 'Table 3: Carbon values and sensitivities 2010–2100, expressed in 2022 £/tCO_2e' was used. This table provides low, central and high values for carbon emissions.

Selection of the evaluation period

After consultation with DESNZ, the evaluation period for the interim evaluation was selected as 2021-2050 (30-years). This was chosen for multiple reasons.

Firstly, a 30-year evaluation period aligns with the UK Green Book principles of longer (i.e. greater than 10-years) evaluation periods for longer-horizon projects where much of the benefits come in later years after a ‘ramp up’ period.

Secondly, this evaluation period – and specifically the end year of 2050 aligns with the UK’s 2050 net zero targets, allowing ‘like for like’ comparisons of the IETFs contribution to EQ12.

Thirdly, while some projects will have reached end of life by 2050 (e.g., those commencing in 2021 and running for 25-years), this will have negligible impact on the BCR and CCE results due to discounting effects in the outer years of the CBA model. The present value of £1 in 30-years’ time is £0.37 at a 3.5 per cent discount rate, and £0.14 at a 7 per cent discount rate.

Interpretation of interim evaluation results for the final evaluation

As noted in the CBA approach section above and the evaluation plan, in the interim evaluation the CBA produced preliminary results for evaluation questions 8-12 based on the available project monitoring data. These metrics (covering 21 projects) are expected to be updated with more fulsome M&V data and also complemented by data points from additional projects as they start reporting results.

It is difficult to draw conclusions using the interim evaluation at the whole of IETF level based on the 21 projects reporting M&V data for multiple reasons:

- Only 3 DD projects were reporting M&V data during the interim evaluation.
- There may be selection bias in the projects that are already reporting M&V data (e.g. they may be collectively more successful than average by the nature of their sooner start dates – providing more emissions reduction and energy cost savings over the evaluation period).
- The ability of a project to generate M&V data (at time of interim evaluation) may itself influence which projects are represented in the sample. Projects reporting earlier may reflect stronger delivery performance and longer-term project success, but this may also be driven by features of the project’s monitoring and verification approach (e.g. fewer disturbance variables, simpler calculation requirements, or limited need for additional metering to account for operational changes outside the IETF project), which enable data to be collected and reported more quickly.
- The funding granted to projects (especially those yet to commence) may change over time, as it is ‘demand led’ based on actual project spend.
- As more projects commence, there may well naturally be an attrition rate, and this is not captured or assumed at time of the interim evaluation (e.g. all 21 projects are expected to continue to generate benefits over the evaluation period).

Therefore, while conservative assumptions have been made throughout the interim evaluation, the final evaluation is expected to add significantly more robust insight into the performance of the IETF across all phases and project types. It is this final evaluation which could then be compared to the 2021 Final Business Case (FBC), to assess overall performance against pre-determined objectives.

Costs

Assumptions on price years associated with costs

DESNZ advised that cost data across the IETF portfolio (recorded in the 'IETF Benefits Database') were not reported on a consistent price-year basis, with estimates variously expressed in nominal terms between approximately 2020 and 2025. In addition, the costs and grant amounts recorded in the 'IETF Benefits Database' reflect total expenditure spread across the delivery period of each project, rather than being attributed to a specific financial year. While delivery teams hold records of spend by financial year, these data were not considered sufficiently reliable for evaluation purposes due to frequent changes in project schedules and associated payment profiles.

To ensure consistency across projects and enable comparability within the QBA, a simplifying assumption was adopted whereby all project costs recorded in the 'IETF Benefits Database' were assumed to be expressed in 2021 prices. The choice of 2021 as the base price year reflects both methodological and programme-specific considerations. 2021 corresponds to the year of the IETF business case, providing alignment with the original appraisal framework. In addition, the majority of projects included in the interim evaluation were drawn from phases 1 and 2 of the programme, with typical project start dates clustered around 2021. As such, using 2021 prices was judged to be the most representative reference year for the portfolio as a whole. These costs were subsequently escalated to 2025 prices using GDP deflators.

This approach provides a transparent and internally consistent basis for aggregating costs across the portfolio. Further assumptions were made regarding the timing in which these costs would be incurred, as described below.

Assumptions on timing of costs

IETF project funding is provisioned to successful funding round competition winners at the completion of the competition based on the size of the EE/DD capital project. In practice, these funds are paid in instalments to project beneficiaries based on actual capital demand over the establishment works.

While IETF grant data was sourced from the 'IETF Benefits Database', this was not provisioned over relevant 'project years' depending on project start date. Therefore, assumptions were made to generate a cost-spend profile (also known as an 'S-curve') to proportion the capital spend each year over four years for all awarded IETF grants in the evaluation.

This approach assumes each one of the 21 projects in the interim evaluation deployed their capital in the same proportions (but at different quantities) over the first 4-years since award. It was not feasible in this interim evaluation to conduct a 'bottom-up' cashflow profile at the individual project level. While the shape of the S-curve assumed for all projects is subjective, it is more representative of actual project costs than alternate approaches like assuming all grant funds are spent in the first year of project operation. If annualised cost/grant data were to become available, this is something that could be considered in the final evaluation.

The ’S-curve’ approach has significant advantages over assuming all capital is deployed by a project beneficiary in year 0 or year 1 of grant being awarded. Namely, it shows the actual cashflow from the DESNZ perspective. Without this assumption, in NPV terms costs would face a lower discounting treatment (and thus have more weight in BCR terms), compared to benefits generated in years 4 and beyond as the project ramps up. This could potentially lower BCRs (by increasing the relative size of the denominator). The assumed S-curve profile (annualised and cumulative) is presented in Table A2 below).

Table A2: S-Curve for IETF funding

Spend year	Proportion of IETF grant	Cumulative proportion of IETF grant
Year 1	10%	10%
Year 2	10%	20%
Year 3	50%	80%
Year 4	30%	100%

Cost counterfactual approach and limitations

IETF grants are awarded for EE and DD projects across a wide variety of industry clusters, each with their own production facilities and equipment. These grants fully or partly fund both capital and operational expenses of EE and DD projects.

Naturally, IETF projects will displace previously forecasted capital works for projects. However, the direction of these changes will vary across projects. For example, it is possible IETF capital works increase ongoing labour maintenance requirements or decrease future capital costs by replacing equipment earlier than would have otherwise been possible. Quantitative estimates of these counterfactual cost profiles were not collected as part of M&V data, and as such have not been included in counterfactual estimates. While in theory these counterfactual costs are unlikely to be zero, and thus should be included in the CBA, using the total project costs as a proxy for these 'additional costs' of the IETF represents a conservative approach.

By extension, terminal values (i.e. value of equipment generated through IETF grants in the last year of the evaluation period) have also not been calculated. While this is a simplifying assumption, the values, and impacts on BCRs are likely small, due to both asset depreciation over its useful life, and discounting when considering NPV.

Full cost accounting in line with HMT Green Book

A CBA developed following HMT Green Book principles typically includes the full resource cost of delivering the intervention, rather than just the fiscal envelope (in this case, IETF grants to individual projects). Categories include:

- Administrative and compliance costs within DESNZ of developing and maintaining the IETF
- Costs associated with providing MRV assistance to projects (e.g. contractor spend)
- Costs associated with developing the interim and final evaluation (e.g. contractor spend)

While these costs are a core part of delivering the IETF and measuring its impact, they are likely to be small in comparison to the size of the fund (with over £50 million spent on the 21 projects included in the interim evaluation, and over £200m forecast to be spent in total). For this reason, the impact of these additional costs will have small effects on the BCR results. These costs were not included in the interim evaluation but could be considered as part of the final evaluation.

Benefits

The quantitative benefits indicators were sourced from the M&V data reported in the 'IETF Benefits Database'. These include:

- **Counterfactual Ex-ante Fuel Consumption (Production-adjusted)**, which refers to the fuel consumption in the absence of the IETF, adjusted using the ratio of actual production to counterfactual production.
- **Actual Fuel Consumption**, which refers to the fuel consumption under the implemented IETF project.
- **Adjusted Benefit - Reduction in Fuel Consumption**, which captures the difference between counterfactual and actual fuel consumption, multiplied by DESNZ adjustment factors for rebound rate, overall risk, fuel impact technical risk score, shutdown risk, and additionality.
- **Adjusted Benefit - Reduction in Cost of Fuel Consumption**, which reflects the monetary savings from reduced fuel consumption and is calculated using fuel-specific retail prices applied to the Adjusted Benefit - Reduction in Fuel Consumption.
- **Adjusted Benefit - Reduction in Emissions**, which captures the combined effect of reported direct emissions reductions (if any) and fuel-mediated emissions reductions, estimated using fuel-specific emissions factors applied to the Adjusted Benefit - Reduction in Fuel Consumption. This reflects the benefits in terms of reduced greenhouse gas emissions.
- **Adjusted Benefit - Reduction in Air Quality Damage**, which reflects improvements in air quality and human health and is estimated using fuel-specific air quality damage factors applied to the Adjusted Benefit - Reduction in Fuel Consumption.

The 'IETF Benefits Database' comprised a MS Excel workbook for each sub-phase (e.g. P1.1, P1.2, P2.1, and so on) of the scheme, each containing an individual data tab for every project within that sub-phase. These project-level tabs contained information on project start dates, lifetimes, and M&V data on production, fuel consumption, and the resulting benefits described above.

A data 'bridge' was designed to collate and aggregate six-monthly M&V data and benefits from individual project tabs within each sub-phase workbook into a single tab containing annual indicator values for all projects within that sub-phase. The data 'bridge' also collated additional information, including DESNZ adjustment factors for rebound rate, overall risk, fuel impact technical risk score, shutdown risk, and additionality, which were used to derive the net benefits attributable to the IETF. The data 'bridge' tabs from each sub-phase workbook were subsequently imported into the CBA model as inputs.

Adjustments to counterfactuals

Counterfactuals indicated the extent to which beneficiaries considered that they could have achieved reductions in the absence of IETF funding over a similar time period and were used to characterise the 'without-IETF' scenario.

As initial assumptions may have underestimated the actions beneficiaries would have undertaken independently, a crucial part of the QBA was to review and, where necessary, update the economic counterfactuals using the evidence collected through consultation activities. Where consultation responses suggested that the most likely outcome in the absence of IETF funding differed from the original assumptions, an alternative counterfactual scenario was characterised. These updated counterfactuals were then used to estimate the net benefits attributable to the IETF.

Updates to the counterfactuals drew on two complementary sources of evidence with respondents in each case providing responses on behalf of individual projects:

- A **beneficiary survey** with 33 respondents
- **Project-level interviews** conducted with 6 interviewees

Both sources provided insights into beneficiaries' expectations regarding the extent of activity they would have undertaken independently in the absence of IETF support. Specifically, beneficiaries were asked to indicate percentage ranges representing the reductions they would have achieved relative to the net reductions delivered by their IETF-funded project (where the IETF project outcome was treated as 100 per cent), covering fuel consumption, energy costs, and carbon emissions:

- In the absence of IETF funding would you have reduced **fuel consumption**? How? By what percentage could this have been reduced (if your IETF project represents 100%)?
- In the absence of IETF funding would you have reduced **energy costs**? How? By what percentage could this have been reduced (if your IETF project represents 100%)?
- In the absence of IETF funding would you have reduced **carbon emissions**? How? By what percentage could this have been reduced (if your IETF project represents 100%)?

Although framed in terms of reductions achieved by the IETF, responses were interpreted as providing an indication of counterfactual behaviour, as respondents generally found it more intuitive to express how fuel consumption, energy costs, and emissions would have been reduced in the absence of IETF funding. Specifically, responses were treated as reflecting the extent to which some action would have been undertaken without IETF support, relative to a baseline scenario in which no action occurred. On this basis, the reported percentage ranges were interpreted as partial reductions to the initial counterfactual assumptions (e.g. a 10% reduction relative to an initial counterfactual fuel consumption level of 400,000 MWh).

These partial reductions were translated into adjustment factors for fuel consumption, energy costs, and carbon emissions. However, as energy cost savings and emissions reductions were directly derived from fuel consumption using fuel-specific retail prices and fuel-specific emissions factors[12] respectively, the adjustment was applied only to fuel consumption (i.e. the Counterfactual Ex-ante Fuel Consumption) to ensure internal consistency across benefit estimates. The resulting adjusted fuel consumption profile was then used to characterise an alternative counterfactual fuel use trajectory, which formed the basis for estimating the net benefits attributable to the IETF.

Adjustment factors were derived from the results of the consultation activities. Where project-specific evidence was available from interviews, these estimates were used directly, as they reflected beneficiaries' own operational circumstances and investment intentions. For all remaining projects, adjustment factors were extrapolated using survey-based evidence.

After excluding non-responses (5 respondents did not provide responses to the questions), the usable survey sample comprised 13 DD projects and 14 EE projects. By funding phase, the usable sample included 17 respondents from Phase 2, four from Phase 1, three from Phase 3, and three respondents who indicated 'don't know'.

The small sample sizes for Phase 1 and Phase 3 limited the robustness of phase-level adjustment factors. Adjustment factors were therefore derived only by project typology.

Based on the percentage ranges provided by survey respondents, three typology-specific adjustment factors were calculated:

- **Lower-bound adjustment factor**, using EE- and DD-specific average minimum for survey responses, and representing a conservative behavioural response in the absence of IETF
- **Central adjustment factor**, using EE- and DD-specific average mid-point for survey responses, and representing the most likely behavioural response
- **Upper-bound adjustment factor**, using EE- and DD-specific average maximum for survey responses, and representing an optimistic behavioural response absent IETF

[12] The adjustment affected only fuel-mediated emissions reductions, which were derived from adjusted fuel consumption using fuel-specific emissions factors. Any direct emissions reductions reported by projects (i.e. reductions not linked to changes in fuel consumption) were not affected and were retained as reported.

These typology-specific adjustment factor values were applied to all projects without interview-based evidence, while interview-derived values were applied directly to the corresponding projects across all three scenarios[13].

Table A3 below presents the survey-derived adjustment factors for EE and DD projects.

Table A3: Adjustment factor values for projects without interview data

Project type	Lower-bound	Central	Upper-bound
EE projects	2.1%	7.7%	13.3%
DD projects	8.3%	17.6%	26.9%

Estimation of benefit streams

The adjusted counterfactual (CF_{Ad}) was estimated and as described above.

$$CF_{Ad}(MWh) = (1 - CAF) * CF_{BD}(MWh)$$

Where CAF refers to the counterfactual adjustment factor, which implies the percentage by which beneficiaries would have reduced their fuel consumption in the absence of the IETF against the counterfactual ex-ante fuel consumption sourced from the 'IETF Benefits Database', referred to as CF_{BD}.

An overall adjustment factor (AF_{BD}), taken from the 'IETF Benefits Database', is also applied to the difference between the adjusted counterfactual and actual consumption. This reflects DESNZ's assessment (as documented in the IETF business case) of each project across a range of parameters, calculated as the product of the assessment scores (in percentage terms) for rebound rate, overall risk, fuel impact technical risk score, shutdown risk, and additionality. The output yields the net adjusted reduction in energy consumption attributable to IETF support ($\Delta\ energy\ consumption_{Ad}$).

$$\Delta\ energy\ consumption_{Ad}\ (MWh) = (CF_{Ad} - C_{BD}) * AF_{BD}$$

Where C_{BD} is the actual fuel consumption sourced from the Benefits Database.

The fuel prices (£/MWh) and fuel-specific emissions factors (tCO2e/MWh) and air quality damage factors (£/MWh) chosen by DESNZ in the Benefits Database were reviewed and retained without any modification to align with DESNZ's assessment of the project benefits.

[13] Adjustment factors derived from interviews were based on narrower percentage ranges and therefore provided more specific, project-level insights. By contrast, survey responses were collected using broader percentage bands, resulting in less granular estimates. Interview-based counterfactual adjustments are not presented here due to confidentiality.

Reductions in energy consumption ($\Delta\ energy\ consumption_{BD}$), costs ($\Delta\ energy\ cost_{BD}$), carbon emissions ($\Delta\ emissions_{BD}$) and air quality damage ($\Delta\ AQD_{BD}$) were sourced directly from the 'IETF Benefits Database' and scaled proportionally to the net adjusted reduction in energy consumption. This approach aligns the monetised impacts in the 'IETF Benefits Database' with the share attributable to IETF support after accounting for the counterfactual adjustments.

As M&V data on energy consumption were only available up to 2025, benefits were extrapolated over the remainder of the project lifetime within the evaluation period (e.g. 2026–2050) by holding the last observed value constant. The number of extrapolated data points varied across projects, reflecting differences in project start years (e.g. 2021-2025) and project lifetimes (e.g. 15-30+ years).

The outputs are the net adjusted reduction in energy costs ($\Delta\ energy\ cost_{Ad}$), carbon emissions ($\Delta\ emissions_{Ad}$) and air quality damages ($\Delta\ AQD_{Ad}$).

$$\Delta\ energy\ cost_{Ad}\ (£) = \sum_{2021}^{2050} \Delta\ energy\ cost_{BD}\ (£)\ * \frac{\Delta\ energy\ consumption_{Ad}\ (MWh)}{\Delta\ energy\ consumption_{BD} (MWh)}$$

$$\Delta\ AQD_{Ad}\ (£) = \sum_{2021}^{2050} \Delta\ AQD_{BD}\ (£)\ * \frac{\Delta\ energy\ consumption_{Ad} (MWh)}{\Delta\ energy\ consumption_{BD} (MWh)}$$

$$\Delta\ emissions_{Ad}\ (tCO_2e) = \sum_{2021}^{2050} \Delta\ emissions_{BD}\ (tCO_2e)\ * \frac{\Delta\ energy\ consumption_{Ad} (MWh)}{\Delta\ energy\ consumption_{BD} (MWh)}$$

In addition, where projects reported direct emissions reductions ($\Delta\ direct\ emissions_{BD}$) not mediated through reduced energy consumption, these were taken as reported in the 'IETF Benefits Database' and added to the fuel-mediated emissions reductions to derive the total emission reductions.

$$\Delta\ total\ emissions_{Ad}\ (tCO_2e) = \Delta\ emissions_{Ad}\ (tCO_2e) + \sum_{2021}^{2050} \Delta\ direct\ emissions_{BD} (tCO_2e)$$

The 'IETF Benefits Database' did not monetise emissions reductions and reported these only in tCO_2e terms. Consequently, the QBA model monetised emissions reductions using the social cost of carbon (SCC) values from the UK Green Book.

$$\Delta\ monetised\ emissions_{Ad} (£) = \Delta\ total\ emissions_{Ad}\ (tCO_2e) * SCC\ (£/tCO_2e)$$

The total project benefits were estimated as the sum of the three monetised benefit streams - reductions in energy costs ($\Delta\ energy\ cost_{Ad}$), monetised carbon emissions ($\Delta\ monetised\ emissions_{Ad}$) and air quality damages ($\Delta\ AQD_{Ad}$).

$$Total\ project\ benefits\ (£) = \Delta\ energy\ cost_{Ad} + \Delta\ monetised\ emissions_{Ad} + \Delta\ AQD_{Ad}$$

Treatment of negative benefit streams

Projects within the IETF portfolio would typically be expected to deliver positive benefits, as actual fuel consumption should be lower than the counterfactual level in the absence of IETF funding. However, during consistency checks of the M&V benefits reported in the 'IETF Benefits Database', it was identified that a small number of projects reported negative benefits. These outcomes were primarily attributable to external disturbance variables, such as temporary or permanent plant shutdowns, part-load operation or restart cycles, or instances where installed technologies did not perform as originally intended.

These negative benefits were retained in the QBA to ensure that the assessment accurately reflects observed project performance. Excluding or adjusting these values would risk overstating portfolio-level impacts and would reduce transparency regarding real-world delivery risks and operational variability.

In addition, some benefit streams that are initially positive become negative following the application of adjustment factors to counterfactual fuel consumption. Adjustment factors are applied to better represent the 'true' counterfactual scenario by accounting for efficiency improvements or fuel-saving measures that beneficiaries would likely have implemented even in the absence of IETF support. Where the application of these factors results in negative benefits, these outcomes were also retained, as they reflect a more conservative and methodologically robust estimate of net additionality.

Overall, the treatment of negative benefits is consistent with a conservative evaluation approach, ensuring that the QBA captures both upside impacts and downside risks, and avoids systematic bias towards overestimating the programme's benefits. Moreover, both positive and negative benefit streams are extrapolated over the remainder of the assumed project lifetime by holding the last observed annual benefit value constant. As a result, the inclusion of negative benefit streams alongside positive streams presents a conservative view of overall IETF impacts. This approach recognises that all positive and negative benefits may not fully materialise over the full project lifetime. Retaining both outcomes therefore avoids optimistic bias and ensures that the QBA reflects a balanced assessment of long-term programme benefits.

CCE, BCR and RPSC

CCE

The carbon emissions (factual and counterfactual) estimated in the 'IETF Benefits Database' were used to estimate the adjusted CO2e emission savings that are attributable to the IETF (answering EQ10), and subsequent contributions of the IETF to national carbon budgets (answering EQ12).

The CCE, defined as the CO2e emissions abated per £ spent, was estimated as a ratio of the adjusted reduction in carbon emissions (against the counterfactual) to the chosen measure of cost (i.e. the IETF grant or the total project cost). Mathematically, this is estimated as follows:

$$CCE\ (kgCO_2e/£) = \frac{\Delta\ emissions_{Ad}\ (kgCO_2e)}{Cost\ (£)}$$

Where $\Delta\ emissions_{Ad}\ (kgCO_2e)$ is the adjusted reduction in emissions and $Cost$ refers to the chosen cost variable, either the IETF grant amount, which captures costs to DESNZ, or the total project cost, which reflects the full social cost of the project, including both public expenditure (i.e. DESNZ grant funding) and private, self-financed costs.

BCR

The costs and benefits in scope for the IETF projects were discounted using the Green Book[14] discount factors to obtain the Net Present Value (NPV) of costs and benefits. A standard discount rate of 3.5% was used for all costs and benefits except the reductions in air quality damages, which were discounted using a reduced rate of 1.5%[15]. The three benefit components – reductions in fuel costs, reductions in air quality damages and monetised reductions in emissions - were aggregated and used to estimate the overall BCR of the IETF (answering EQ11).

The BCR was estimated as the ratio of the NPV of project benefits to the NPV of the total project costs (i.e., the sum of the IETF grant and self-financing.

$$BCR = \frac{Total\ project\ benefits_{NPV}\ (million\ £)}{Total\ project\ costs_{NPV}\ (million\ £)}$$

RPSC

Alongside the BCR, the RPSC was estimated as a measure of the net social value generated per unit of public investment in the IETF scheme. The metric is defined as the ratio of the NPV of total project benefits (net of the NPV of non-public sector costs i.e., the difference between the total project costs and the IETF grant amount) to the NPV of the public sector costs i.e., the IETF grant amount.

$$RPSC = \frac{\{Total\ project\ benefits_{NPV}\ - [Total\ project\ costs_{NPV} - IETF\ grant_{NPV}]\}(million\ £)}{IETF\ grant_{NPV}\ (million\ £)}$$

A ratio greater than 1 would imply that benefits exceed costs and the scheme delivers a net benefit to society that exceeds the expenditure incurred for delivering the projects.

[14] HM Treasury (2026) 'The Green Book and accompanying guidance'
[15] Defra (2025) 'Air quality appraisal: damage cost guidance'

Sensitivity analysis

Retail prices, emissions factors and air quality factors

The retail price series (£/MWh), emission factor series (tCO2e/MWh) and air quality damage factor series (£/MWh) for each fuel over the assessment period 2021-2050 are carefully selected by DESNZ by reviewing all available data and guidance. The chosen series are documented in the 'IETF Benefits Database', and are kept constant across different sub-phases of the IETF for consistency. The QBA takes these series as given, aligning its monetised fuel and air quality damage savings with those estimated by DESNZ in the 'IETF Benefits Database'.

Analysis of scenarios

The CBA model has considered sensitivities across three key parameters:

- **Programme costs:** These were derived from the 'IETF Benefits Database'. Both the IETF grant amounts and total project costs were tested with a +/- 25% adjustment factor (low and high sensitivities respectively) applied to the estimates sourced from the 'IETF Benefits Database' (medium sensitivity) to account for potential over or underspend.
- **Counterfactual adjustment factor:** These were derived from the beneficiary consultation activities, implying the percentage by which beneficiaries would have reduced their fuel consumption in the absence of the IETF. Three alternative counterfactual estimates were defined based on beneficiary survey and interview responses: an average 'central' estimate, along with lower and upper bounds estimates that represent the extremes of the response ranges provided by the beneficiaries.
- **Carbon values:** These were derived from the UK Green Book, which provides 'central', 'low' and 'high' carbon values (in £/tCO2e). Since the emission reductions in the 'IETF Benefits Database' were not monetised, this is done in the QBA model values by using these values as a measure of the social cost of carbon.

A combination of these parameters was used to define three sensitivity scenarios in the QBA model – a likely 'medium' sensitivity scenario which comprises the main results of the QBA, and unlikely but possible 'low' and 'high' sensitivity scenarios which represent the lower and upper bounds of the QBA results. The parameter values mapped to each scenario are defined as described in Table A4 below:

Table A4: Definition of sensitivity scenarios (medium, low and high sensitivities)

Parameter	Medium sensitivity	Low sensitivity	High sensitivity
Programme costs	+0%	+25%	-25%
Counterfactual adjustment factor	Central	Upper bound	Lower bound
Carbon value	Central series	Low series	High series

Overall, the sensitivity analysis indicates that the IETF portfolio continues to deliver positive net benefits in the 'high' sensitivity scenario, driven primarily by energy cost savings and emissions reductions. However, the net benefits are estimated to be negative under the 'low' sensitivity scenario, reflecting the heterogeneous nature of project performance and associated delivery risks within the portfolio.

The unlikely but possible 'low-high' ranges reported alongside the main 'medium' sensitivity estimates indicate a high degree of sensitivity in the CBA results. At the portfolio level, total project benefits range from a -£6 million to £309 million (NPV, 2025 prices), while the BCR spans from close to zero to 8.8. Similar variability is observed for EE portfolio, which represents more than 85% of the projects included in the interim evaluation. In contrast, DD projects exhibit narrower ranges, with a BCR between 0.9 and 2.6 across the sensitivity ranges, reflecting both the smaller sample size and the early-stage nature of these interventions (given the start dates in 2024-2025).

Comparing the results with the FBC, the sensitivity analysis results show that RPSC (based on the limited data available as part of the interim evaluation) is estimated to range between -£0.40 to £23.80 per £1 of public spending. This is aligned with the direction and magnitude of results in the FBC, which ranged from -£0.80 to £23.80 per £1 of public spending.

Further investigation reveals that the negative benefits in the 'low' sensitivity scenario driven by one EE project with significantly large negative benefits in the 'IETF Benefits Database' that are amplified by the counterfactual adjustments applied as part of the QBA. This indicates that while many projects are likely to deliver strong value for money, a minority may underperform or generate negative net benefits that could be large enough to offset the positive benefits of the other projects in the portfolio.

Overall, these ranges highlight that the portfolio-level results are driven by a mix of high-performing and lower-performing projects, and that the 'medium' estimates should be interpreted as indicative averages rather than outcomes that may be uniformly realised across all projects.

The sensitivity analysis of the estimated benefits is presented in Table A5 below.

Table A5: Sensitivity analysis of estimated benefits (medium [low–high] sensitivities)

Benefit indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in energy consumption (GWh)	445 GWh [(-)910 – 1,790]	25 GWh [20 – 30]	470 GWh [(-)880 – 1,820]
Net reduction in energy costs (million £, 2025£)	£135 million [£8 – £261]	£1.4 million [£1 – £1.5]	£136 million [£9– £263]
Net reduction in carbon emissions (tCO2e)	103,500 tCO2e [(-)160,700 – 367,700]	1,400 tCO2e [600 – 2,200]	104,900 tCO2e [(-)160,100 – 369,900]

Note: Negative values are indicated with (-). Any minor differences in totals are due to rounding.

The sensitivity analysis of the estimated costs and CCE is presented in Table A6 below.

Table A6: Sensitivity analysis of estimated costs and CCE (medium [low-high] sensitivities)

Cost indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in carbon emissions (tCO2e)	103,500 tCO2e [(-)160,700 – 367,700]	1,400 tCO2e [600 – 2,200]	104,900 tCO2e [(-)160,100 – 369,900]
Total IETF grant (million £, 2025£)	£18 million [£13 – £22]	£1 million [£0.7– £1.2]	£19 million [£14 – £23]
CCE per £ of IETF grant (kgCO2e/£)	5.8 kgCO2e/£ [(-)7.3 – 27.7]	1.4 kgCO2e/£ [0.5 – 3.0]	5.6 kgCO2e/£ [(-)6.9 – 26.4]
Total project costs (million £, 2025£)	£53 million [£40 – £66]	£2 million [£1 – £2.1]	£55 million [£41 – £68]
CCE per £ of total project costs (kgCO2e/£)	2.0 kgCO2e/£ [(-)2.4 – 9.3]	0.8 kgCO2e/£ [0.3 – 1.7]	1.9 kgCO2e/£ [(-)2.3 – 9.0]

Note: Negative values are indicated with (-). Any minor differences in totals are due to rounding.

Finally, the sensitivity analysis of the NPV of the estimated costs and benefits and resulting BCR is presented in Table A7 below.

Table A7: Sensitivity analysis of NPV of estimated costs and benefits (discounted to 2021), and BCR (medium [low-high] sensitivities)

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Net reduction in energy costs (NPV, million £, 2025£)	£92 million [£10 – £171]	£1 million [£0.9 – £1.1]	£93 million [£12.5 – £172]
Monetised net reduction in carbon emissions (NPV, million £, 2025£)	£27 million [(-)£17 – £132]	£0.3 million [£0.1 – £0.8]	£27 million [£(-)17 – £133]
Net reduction in air quality damage costs (NPV, million £, 2025£)	£0.4 million [(-)£1.7 – £2.5]	£0.7 million [(-)£0.6 - £0.8]	£1 million [(-)£1 – £3.0]
Total project benefits (NPV, million £, 2025£)	£118 million [(-)£9 – £306]	£2 million [£1.6 – £3]	£120 million [(-)£6 – £309]

Indicator	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
Total IETF grant (NPV, million £, 2025£)	£15 million [£11 – £19]	£0.8 million [£0.6 – £1]	£16 million [£12 – £20]
Total project costs (NPV, million £, 2025£)	£45 million [£34 – £57]	£1.5 million [£1 – £2]	£47 million [£35 – £59]
Return on public sector cost (RPSC)	5.8 [(-)0.5 – 24.8]	1.8 [1.6 – 3.8]	5.6 [(-)0.4 – 23.8]
BCR	2.6 [(-)0.2 – 9.0]	1.5 [0.9 – 2.6]	2.6 [(-)0.1 – 8.8]

Note: Negative values are indicated with (-). Any minor differences in totals are due to rounding.

One-at-a-time sensitivity testing

To test which parameter is driving the observed sensitivity of the QBA results, additional sensitivity testing was done using the 'Medium' sensitivity scenario as a base case and testing the sensitivity of the BCR to the range of parameter values on a parameter-by-parameter basis. For example, when testing the sensitivity to counterfactual adjustment factor values, only the factor values were changed across the 'medium', 'low' and 'high' sensitivities whereas all other parameters were fixed at the 'medium' sensitivity level.

The results of this testing are provided in Table A8 below. As expected, the results are mainly driven by the counterfactual adjustment factor and resulting adjusted counterfactual levels of fuel consumption. All other parameters result in BCRs that exceed 1 across the range of their parameter values.

Table A8: One-at-a-time sensitivity analysis of BCRs to parameters (medium [low-high] sensitivities of the parameter tested)

BCR (parameter tested)	EE projects (N=18)	DD projects (N=3)	All projects (N=21)
BCR (Counterfactual adjustment factor)	2.6 [(-)0.6 – 5.8]	1.5 [1.2 – 1.8]	2.6 [(-)0.5 – 5.6]
BCR (Carbon values)	2.6 [2.3 – 2.9]	1.5 [1.4 – 1.6]	2.6 [2.3 – 2.8]
BCR (Programme costs)	2.6 [2.1 – 3.5]	1.5 [1.2 – 2.0]	2.6 [2.0 – 3.4]

Note: Negative values are indicated with (-)

The 'high' counterfactual adjustment factor scales down the counterfactual fuel consumption to an extent that it results in a negative net benefit attributable to the IETF, and therefore a negative BCR. As explained above, this result is driven by one EE project which reported actual fuel consumption under the IETF to be higher than the counterfactual levels due to unforeseen technological disturbances. The scaling down of the counterfactual results in an even larger negative benefit which counteracts the benefits generated by the other 20 projects.

Carbon budgets and 2050 Net Zero target

Estimating the contribution of the IETF to the UK's climate objectives required assessing its impact against both the Net Zero 2050 target and the Carbon Budgets (CBs).

The assessment was structured around a two-stage approach:

- **A long-term assessment of the IETF's contribution to the Net Zero 2050**. This stage compared the projected lifetime abatement from IETF projects to 2050 with the cumulative emissions reductions required to achieve Net Zero over the same period. This comparison provides a high-level indication of the scale of the programme relative to the overall long-term decarbonisation challenge facing the UK.
- **A mid-term assessment of the IETF's contribution in relation to the CBs**. CBs act as statutory checkpoints on the pathway to Net Zero 2050 by translating the long-term target into specific, time-bound milestones. Given that the IETF operates exclusively within the industrial sector, this stage was framed as a comparison between IETF-induced abatement and the industrial sector's required emissions reductions within each budget period.

Contribution to the Net Zero 2050 target

The contribution of the IETF to the Net Zero 2050 target was assessed as the share of cumulative UK-wide emissions reductions delivered by IETF-funded projects over the period 2021-2050. This was estimated as a ratio of the total adjusted emissions reductions attributable to the IETF to the cumulative emissions reductions required for the UK to reach Net Zero by 2050 over the same time period. Mathematically, this was estimated as follows:

$$IETF\ contribution\ to\ Net\ Zero\ 2050 = \frac{\sum_{2021}^{2050} \Delta\ emissions_{Ad}(MtCO_2e)}{\sum_{2021}^{2050} \Delta\ emissions^{UK}(MtCO_2e)}$$

Where:

- $\sum_{2021}^{2050} \Delta\ emissions_{Ad}$ denotes the **adjusted lifetime reduction in emissions attributable to IETF-funded projects over 2021–2050**, derived from project-level fuel consumption reduction in the 'IETF Benefits Database' and associated carbon emission factors (see Benefits section for methodological detail), and converted to $MtCO_2e$.
- $\sum_{2021}^{2050} \Delta\ emissions^{UK}$ denotes the **cumulative volume of UK-wide greenhouse gas emissions consistent with a stylised pathway to Net Zero over 2021–2050**. This term represents the overall scale of national decarbonisation required for the UK to meet its Net Zero 2050 target over the same time horizon used for the IETF assessment.

- The benchmark combined observed historical emissions with a stylised forward pathway. Specifically, total UK greenhouse gas emissions for 2021–2023 were taken directly from the UK government's Final Greenhouse Gas Emissions Statistics (table 1.1) and summed as reported. From 2023 onwards, a simple reference pathway was constructed by assuming that national emissions decline steadily from their 2023 level to zero by 2050. Annual emissions under this stylised post-2023 pathway were calculated for each year between 2024 and 2050 and added to the observed 2021–2023 emissions to obtain a single cumulative total expressed in $MtCO_2e$ for 2021–2050[16]. This stylised pathway is used as a simplifying assumption; alternative trajectories (e.g. using Carbon Budget emissions limits as intermediate checkpoints) could be explored in future analysis.

Contribution to CBs

CBs set legally binding, economy-wide limits on greenhouse gas emissions over defined five-year periods, setting the trajectory towards the Net Zero 2050 target.

For estimating the extent to which the IETF has contributed to the achievement of the CBs, particularly CB4 (2023-2027), CB5 (2028-2032) and CB6 (2033-2037), the intended approach was to assess the share of cumulative UK-wide industrial emissions reductions delivered by IETF-funded projects over each CB period. This assessment conceptually comprised two elements:

- The **adjusted emissions reductions attributable to IETF-funded projects within the relevant CB period**, derived from project-level fuel consumption reduction in the 'IETF Benefits Database' and associated carbon emission factors (see Benefits section for methodological detail).
- The **industrial sector's required emissions reductions under each CB**. This term represents the sector's expected contribution to economy-wide decarbonisation within the relevant CB period.

The second element, however, proved methodologically challenging at the interim evaluation – and should be revisited in the final evaluation. In particular, the industrial sector's required emissions reductions under each CB are derived from the UK's Energy and Emissions Projections (EEP). These projections already embed the expected effects of existing and planned industrial decarbonisation policies (including a substantial share of the IETF portfolio) within the baseline emissions trajectory used to calculate each CB.

[16] The rate of decline implied by the linear pathway is consistent with the long-term historical trend in emissions; over 1990–2023, emissions decreased at an average rate of approximately −0.0717 $MtCO_2e$ per year, compared with −0.0701 $MtCO_2e$ per year implied by a linear decline from the 2023 level to Net Zero in 2050.

In practical terms, this meant that the baseline was already lower than it would have been in the absence of IETF. As a result, the figures showing the emissions savings required to meet the residual emissions level were smaller than they would be if IETF savings were absent from the baseline.

The implication was direct:

- The **denominator** (i.e. the industrial sector's required emissions reductions under each CB) had already been reduced due to the IETF, and
- The **numerator** (i.e. the adjusted emissions reductions attributable to IETF-funded projects within the relevant CB period) captured the same set of savings again

This created a structural double counting problem. Comparing total IETF savings to today's required savings would have artificially inflate the apparent contribution of the programme, because part of that contribution had already been accounted for in the modelling that generated the requirement itself.

The only IETF-related savings not incorporated into the EEP and thus not embedded in the baseline were those relating to carbon capture, usage and storage (CCUS). These could have been compared to current savings required. However, most IETF-funded projects considered in the interim evaluation are non-CCUS, meaning this comparison would have capture a very small fraction of the IETF impact.

An intuitive approach would have been to add back forecast IETF savings to today's baseline to recreate a 'worldview' without IETF before making the comparison. However, because the projections are generated using a non-linear modelling process that jointly determines multiple variables, the baseline could not be modified by simply adding or subtracting a quantity of emissions. Doing so would have broken the internal validity of the model.

Moreover, attempting to manually adjust the baseline would have distorted the comparison in two possible ways:

- **If the interim evaluation estimates of IETF savings exceeded those embedded in the baseline**, the adjusted baseline would have inflated the remaining savings requirement, making the IETF appear more impactful than it is
- **If the interim evaluation estimates of IETF savings were lower than those embedded in the baseline**, the adjustment would have artificially raised the baseline, thereby understating the IETF's true contribution

For these reasons, the baseline could not be retrofitted or recalibrated without re-running the full government modelling suite that generates the CB projections.

To progress EQ12, the most technically correct approach would have been to compare total IETF programme savings to the industrial savings requirements calculated before IETF savings were embedded into the EEP baseline. Using such a historical snapshot would have ensured that the denominator reflects a modelling baseline in which IETF-induced reductions were not yet incorporated.

This would have provided a consistent and reliable basis for attribution, allowing total programme savings to be compared against a requirement that genuinely represents a pre-IETF scenario and avoiding the double-counting problem inherent in the current projections.

As historical baselines do not include savings from other policies that have since materialised, the industrial savings required appeared larger than today's requirement. Therefore, the IETF would have represented a smaller share when measured against earlier, higher emissions reduction requirements. This meant any contemporary estimate of the IETF's percentage contribution would have been conservative.

Given historical baselines were not available at time of analysis, the discussion of EQ12 focuses on the contribution to the Net Zero 2050 target.

Broader effects

The IETF could generate rebound, displacement, and spillover effects that may either diminish or amplify its long-term contribution to the Net Zero 2050 target and mid-term contribution in relation to CBs. These effects operate through a range of mechanisms that could alter the net system-level impact of the programme relative to the project-level estimates presented in this evaluation.

Potential positive mechanisms (spillovers) include:

- Replication of supported technologies or practices at additional sites within funded firms
- Diffusion of similar energy-efficiency or fuel-switching measures across the wider industrial sector
- Learning effects that lower costs or accelerate the uptake of industrial decarbonisation technologies over time

Potential negative mechanisms (rebound or displacement effects) include:

- Behavioural or operational responses that increase energy use following efficiency improvements[17]
- Production-side adjustments that offset part of the initial emissions reductions
- Reallocation of industrial activity that reduces net system-level emissions savings

Taken together, these mechanisms suggest that the observed project-level abatement may not translate one-for-one into aggregate national emissions reductions. The estimates presented in this evaluation should therefore be interpreted as indicative of the IETF's direct contribution, rather than as a complete accounting of all indirect or system-wide effects.

[17] Recent DESNZ-commissioned research on rebound effects in industrial energy efficiency may be relevant for further consideration in the final evaluation. See: DESNZ (2026). Industrial energy and resource efficiency rebound effects. Available at: DESNZ (2026) '[Industrial energy and resource efficiency rebound effects]'

This publication is available from: www.gov.uk/government/publications/industrial-energy-transformation-fund-ietf-interim-impact-evaluation