Evaluation of Industrial Energy Transformation Fund (IETF)

Final Process Evaluation

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Executive Summary

Programme overview

The Industrial Energy Transformation Fund (IETF) is a government-funded scheme that supports the UK's commitment to reaching Net Zero by 2050. The IETF launched in 2020, and is in 3 phases with £500 million of funding available up until 2028[1].

The IETF aims to support industry in identifying a pipeline of future projects by co-funding feasibility and engineering studies and improving the energy efficiency of industrial processes. The funding brings the payback of projects within an investable range for companies and incentivises early movers by making low-carbon investment financially more attractive than the carbon-intensive alternative.

The projects funded by the IETF aim to demonstrate the viability of a range of transformational technologies[2] with the potential to be replicated across the UK industry, creating knowledge and spill overs within industry, as well as government knowledge of the costs, risks and benefits of these technologies.

During Phase 1 and 2, £171 million of funding was awarded to over 140 projects, leveraging £410 million of private capital.

Key Findings from Final Process Evaluation

This report summarises the findings from a Final Process Evaluation conducted in 2024-2025, and covers Phase 1 and 2 of the IETF. The evaluation was conducted by Technopolis Ltd, a science and technology policy evaluation consultancy. The evaluation methodology included a survey with beneficiaries and stakeholder interviews with beneficiaries, delivery team, assessors, monitoring officers and withdrawn successful applicants. This process evaluation follows an interim Phase 1 process evaluation conducted in 2021, and will be followed by an interim impact evaluation in 2025 and a final impact evaluation in 2033. The evaluation report answers research questions associated with the processes of the IETF in line with the following themes:

- IETF Application
- IETF Assessment, Due Diligence, Award
- IETF Delivery
- IETF Benefits Monitoring

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[1] https://www.gov.uk/government/collections/industrial-energy-transformation-fund
[2] IETF supported energy efficiency technology at Technology Readiness Level (TRL) 8 or above and decarbonisation technology at TRL 7 or above. TRL 7 is when a prototype has been demonstrated in an operational environment.

- Wider questions, such as assessing the programmes contribution to net zero and unintended consequences

Finding 1: Attractiveness of the IETF offer: IETF was seen as an attractive offer, supporting the implementation of mature technologies at scale

Most responses from beneficiaries indicated that projects would not have gone ahead without IETF support. The fund filled a gap in capital expenditure support for these types of initiatives, allowing companies to take on more risk with feasibility studies and non-core technology projects.

Grant funding provides support to organisations in creating business cases to invest, accelerating deployment of more efficient and low-carbon technologies.

Finding 2: Application process: The application assessment process and guidance was viewed as good quality. However, short application windows and high applicant burden led to challenges for applicants in delivering high quality applications.

Most beneficiaries found the application guidance and support to be helpful and good quality and most relied on the guidance notes as well as email support for clarifications. Beneficiaries cited time and resource constraints as a primary barrier to applying, particularly affecting smaller applicants. Linked to the high level of application administration burden, several applicants relied on consultants to support with bid preparation.

Finding 3: Assessment, due diligence and pre-application support: Beneficiaries and assessors considered these to be fit for purpose but long award timelines were identified as a key area for improvement.

Beneficiaries found the assessment criteria to be clear and consistently applied. Assessors found the scoring criteria complex and challenging to apply particularly for assessments of additionality, but overall they reported that the criteria and review process were robust and well structured. The scheme received mixed quality applications with a total value exceeding the funding available, though the final total funding awarded was around 50% of total available funds indicating rigorously applied award criteria.

Award timelines of 6-9 months were identified as problematic for several applicants, resulting in some withdrawals from the programme, and contracted timelines for project delivery. The delivery team recognised that application assessment and due diligence is demanding, but viewed it as striving to provide necessary assurance over public grants.

Finding 4: Project Delivery: IETF processes and support from DESNZ contractors typically facilitated project teams to deliver against their plans as expected, however some elements of reporting were considered overly burdensome.

Grant administration has facilitated good project progress across the grant portfolio, however, Milestone Payment Claims and Project Change Requests were often seen as somewhat burdensome.

Support provided by DESNZ and technical contractors is viewed positively by beneficiaries. DESNZ and external contractors maintained a good relationship in delivering monitoring activities, though some overlap in roles in early stages occasionally led to a less efficient delivery.

Beneficiaries found quarterly progress reviews useful for sharing information and receiving guidance, however Monitoring officers (MOs) reflected that the light touch project monitoring led to gaps in the DESNZ understanding of project risks, challenges and likely overspends, and also reported few options to support struggling projects other than extending timelines. MOs also faced challenges assessing Milestone Payment Claims due to a lack of detail/criteria to confirm eligibility of expenditure.

Finding 5 Benefits monitoring - Monitoring & Verification (M&V): M&V processes are broadly seen as well designed, supportive of project delivery, and proportionate to the scale and complexity of projects. However, there were a mix of views highlighting potentially burdensome requirements. There is scope for further tailoring of M&V processes to ensure proportionality relative to project size.

Based on the combined assessment of beneficiaries and monitoring officers, the study team view the programme M&V system as well designed to strike a balance between tailored and proportionate M&V plans while ensuring sufficient rigour and detail to capture performance data. There were a mix of views indicating M&V requirements may sometimes be disproportionately burdensome for some projects; there was no strong pattern in the data, though larger firms were more likely to report M&V requirements as being duplicative of data that they already captured and smaller firms were more likely to view IETF M&V as adding value in terms of providing monitoring data, though they still typically regarded it as burdensome to implement. Participation in the IETF does appear to have encouraged more M&V activity across the board, representing new and useful data capture for many firms, but also duplication of current efforts for some firms. The support provided in developing M&V plans was considered good quality, and M&V design and support was perceived to have improved through subsequent competition windows. The design of M&V systems to capture the intended energy and emissions data was viewed positively, though the role of M&V in demonstrating programme benefits is yet to be realised in the programme delivery cycle as data collection continues 5 years post-completion and is not yet available.

Finding 6: Alignment with transition to Net Zero: IETF is recognised for effectively supporting the transition of UK industry to a decarbonised future.

The IETF aims to fulfil a niche within the UK net zero policy portfolio by supporting the deployment of established industrial energy efficiency and decarbonisation technologies at scale by lowering payback periods and perceived risk. The study finds that the

programme appears to help incentivise multinational companies to prioritise decarbonisation investments in their UK subsidiaries, enhancing the UK's competitive position within global corporate structures. Improvements to programme processes set out above could further strengthen the role of DESNZ in supporting the UK's net zero strategy in the area of industrial decarbonisation.

Key Findings from the Assessment of the Theory of Change

The Final Process Evaluation also aims to test the validity of the Theory of Change (ToC) for the programme.

The evaluation uses a ToC diagram developed by DESNZ prior to the evaluation study delivery, which the external evaluation team assessed for validity. The wider ToC also includes a Theory of Change Supplement (ToCS) also developed by DESNZ, that makes the assumptions of the ToC causal story explicit and identifies evidence that may be needed to test the ToC causal linkages.

As part of the assessment of the ToC, the Final Process Evaluation tests links between inputs, applicant decision-making, and early-stage IETF activities and outputs.

Finding 7: Overall, the IETF Theory of Change broadly holds true.

There is strong evidence to support that the IETF Theory of Change remains fit for purpose. The programme set out to overcome both financial barriers to project delivery, and capability barriers in the wider sector through two separate but complementary causal pathways. There is evidence that the activities undertaken by the programme are supporting firms to overcome both these barriers to longer term uptake of low carbon technology for industrial processes.

Finding 8: There is strong evidence, triangulated across data sources, to demonstrate that financial barriers have been overcome for all interviewed/surveyed projects.

Beneficiary interviews and surveys revealed that financial barriers have been overcome using IETF grants to successfully deliver both studies and deployment projects. There is emerging evidence that this has led to a pipeline of studies, based on the number of completed study grants. Businesses have implemented projects earlier than expected and are using novel technology as a result of the financial support available from IETF funding.

Finding 9: There is emerging evidence to demonstrate that capability barriers have been reduced

There is emerging evidence that capability barriers have been overcome or reduced through project funding. This occurred primarily by providing resource and capacity to

engage with new technologies, as well as facilitating partnerships with external expertise such as consultants and academics. There is emerging evidence of knowledge being disseminated from project beneficiaries to other prospective applicants and wider industry through knowledge sharing activities facilitated by government. There is also emerging evidence of wider knowledge spillovers to industry, predominantly through beneficiary supply chain relationships with equipment suppliers and consultants.

Glossary

The following abbreviations are used throughout this report.

Abbreviation	Definition
CAPEX	Capital expenditure
CCSA	Carbon Capture & Storage Association
CCUS	Carbon Capture, Usage and Storage
DD	Deep Decarbonisation (now known as Decarbonisation)
DESNZ	Department for Energy Security and Net Zero
EE	Energy Efficiency
EEF	Energy Entrepreneurs Fund
ETS	Emissions Trading Scheme
FEED	Front End Engineering Design
GAP	Grant Assessment Panel
GOL	Grant Offer Letter
IDHRS	Industrial Decarbonisation and Hydrogen Revenue Support
IDRIC	The Industrial Decarbonisation Research and Innovation Centre
IEEA	Industrial Energy Efficiency Accelerator
IETF	Industrial Energy Transformation Fund
ISCF	Industrial Strategy Challenge Funds
M&V	Monitoring and Verification
MO	Monitoring Officer
MRPN	A meter point reference number
QPM	Quarterly Progress Meeting
RQ	Research Question
SME	Small and Medium Enterprise
ToC	Theory of Change
ToCS	Theory of Change Supplement

Introduction

Background and Objectives of IETF

The Industrial Energy Transformation Fund (IETF) is a government-funded scheme that supports the UK's commitment to reaching Net Zero by 2050. The IETF aims to reduce energy demand and industrial emissions, supporting the delivery of carbon budgets 5[3] and 6[4].

The IETF aims to support industry in identifying a pipeline of future projects by co-funding feasibility and engineering studies and improving the energy efficiency of industrial processes by bringing the payback of projects within an investable range for companies, incentivising early movers by making low-carbon investment financially more attractive than the carbon-intensive alternative.

The projects funded by the IETF aim to demonstrate the viability of a range of transformational technologies[5] with the potential to be replicated across the UK industry, creating knowledge and spill overs within industry, as well as government knowledge of the costs, risks and benefits of these technologies.

The IETF launched in 2020 and is in three phases with £500 million of funding available up until 2028[6]. Table 1 below describes the main characteristics and differences of each phase. Phase 3 is not in scope for the Final Process Evaluation.

Table 1 Description of the three IETF Phases

Phase 1 (c.£70m)	Phase 2 (c.£220m)	Phase 3 (c.£185m)
Launched in 2020, consisting of two competition windows funding feasibility and engineering studies and EE deployment. The fund aimed to support the deployment of energy efficiency projects and conducted energy efficiency and decarbonisation studies with an emphasis on immediate energy efficiency improvements	Comprised of four competition windows spread out from 2022 to 2023, it expanded eligibility to support the deployment of decarbonisation technology. During this phase the minimum grant threshold was lowered to £250,000 to accommodate and incentivise the participation of SMEs	Launched in 2024, it continued the support for studies and deployment projects including additional eligible sectors such as controlled environment horticulture and industrial laundries. It incorporated feedback that redefines the fund's design and further simplifies the application process.

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[3] https://www.theccc.org.uk/wp-content/uploads/2015/11/Committee-on-Climate-Change-Fifth-Carbon-Budget-Report.pdf
[4] https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf
[5] IETF supported energy efficiency technology at Technology Readiness Level (TRL) 8 or above and decarbonisation technology at TRL 7 or above. TRL 7 is when a prototype has been demonstrated in an operational environment.
[6] https://www.gov.uk/government/collections/industrial-energy-transformation-fund

During Phase 1 and 2, £171 million of funding was awarded to over 140 projects, leveraging £410 million of private capital.

Context: First-Stage Process Evaluation (2021)

In 2021, DESNZ commissioned a process evaluation of Phase 1 of the IETF[7], aiming to assess the effectiveness of Phase 1's design, delivery and outcomes. This evaluation examined the programme's governance, industry engagement and alignment with the UK's net zero goals. It identified areas for improvement and proposed recommendations for subsequent funding phases.

The Phase 1 evaluation methodology included a desk review of programme documentation and comparator programmes, and interviews with applicants (successful and unsuccessful), non-applicants, programme delivery staff and wider stakeholders. Thematic analysis was then undertaken to assess programme processes and to conduct a light touch review of the programme Theory of Change.

The First-Stage Process Evaluation found that Phase 1's programme design and governance was aligned with the UK's decarbonisation agenda, and that the improved ToC reflected clear links between objectives, activities and impacts.

However, it identified challenges with regards to the initial eligibility criteria, which was found to lack clarity, creating uncertainty for applicants, as well as in relation to under-addressing the supply-side development (e.g. expertise and market readiness for decarbonisation).

To mitigate these challenges, the evaluation recommended updating the ToC on a semi-annual basis to reflect lessons learned and integrate qualitative impacts, as well as expanding communication with industry stakeholders to align the IETF with adjacent policies and innovations.

In regard to the pre-application support and the application process, the evaluation highlighted that firms were generally well-informed, but SMEs faced barriers, including resource limitations and difficulties navigating the programme due to its complexity.

Results suggested that many non-applicants were unaware of the programme or overwhelmed by its complexity and the amount of information requested within the application stage. The evaluation recommended targeting SMEs with tailored outreach and simplified guidance, as well as providing workshops or advisory services to improve engagement and understanding of the eligibility criteria.

Findings related to the assessment and award suggested that the process needed refinement for consistency (e.g. differences in assessors' evaluations), and feedback revealed strong

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[7] https://assets.publishing.service.gov.uk/media/614ae44c8fa8f503b680e9cc/ietf-phase-1-evaluation-report.pdf

interest from participants in a two-stage (i.e. initial eligibility review followed by a detailed submission) application process to maximise the efforts.

The conclusions indicated that Phase 1 of the IETF established a strong foundation for future funding windows and contributed to improve decarbonisation awareness. It highlighted the importance of adaptative governance and iterative improvements in future window.

The final process evaluation covers both Phase 1 and Phase 2, and develops some comparisons on the evolution of the fund's delivery.

Evaluation Aims

The main purposes of the final process evaluation are:

1 Independence - Exhibit transparency and accountability for the design and delivery process of the IETF.

2 Influence – Inform the policy and delivery design of other government schemes, especially those relating to industry, energy efficiency and decarbonisation

The evaluation report is structured around answering research questions in line with the following themes:

- IETF application
- IETF Assessment, Due Diligence, Award
- IETF Delivery
- IETF Benefits & Benefits Monitoring Wider questions, such as assessing the programmes contribution to net zero and unintended consequences.
- Theory of Change

A full list of evaluation questions is set out in Annex A.

Theory of Change

The Final Process Evaluation also aims to test the validity of the earlier stages (Inputs > Outputs) of the Theory of Change (ToC) for the programme.

During 2021, a preliminary ToC was developed for the IETF by external contractors. It emphasised quantitative monitoring metrics to serve the project's Benefits Management governance regime but had limited detail on the causal narrative.

The DESNZ IETF Monitoring & Evaluation team worked on expanding and developing the preliminary ToC, expanding on causal claims through a supplement, which details the causal links and prospective indicators for evaluation.

The ToC diagram for the IETF is shown in Figure 1, below. The wider ToC also includes a Theory of Change Supplement (ToCS) (Annex B) developed by DESNZ, that makes the assumptions of the ToC causal story explicit and identifies evidence that may be needed to test the ToC causal linkages.

The Final Process Evaluation tests the causal pathways between Boxes 1-19, focusing on the links between inputs, applicant decision-making, and early-stage IETF activities and outputs. As described in the report findings, the Theory of Change was not updated during this evaluation as it was found to be valid and accurate.

Figure 1 IETF Theory of Change Diagram
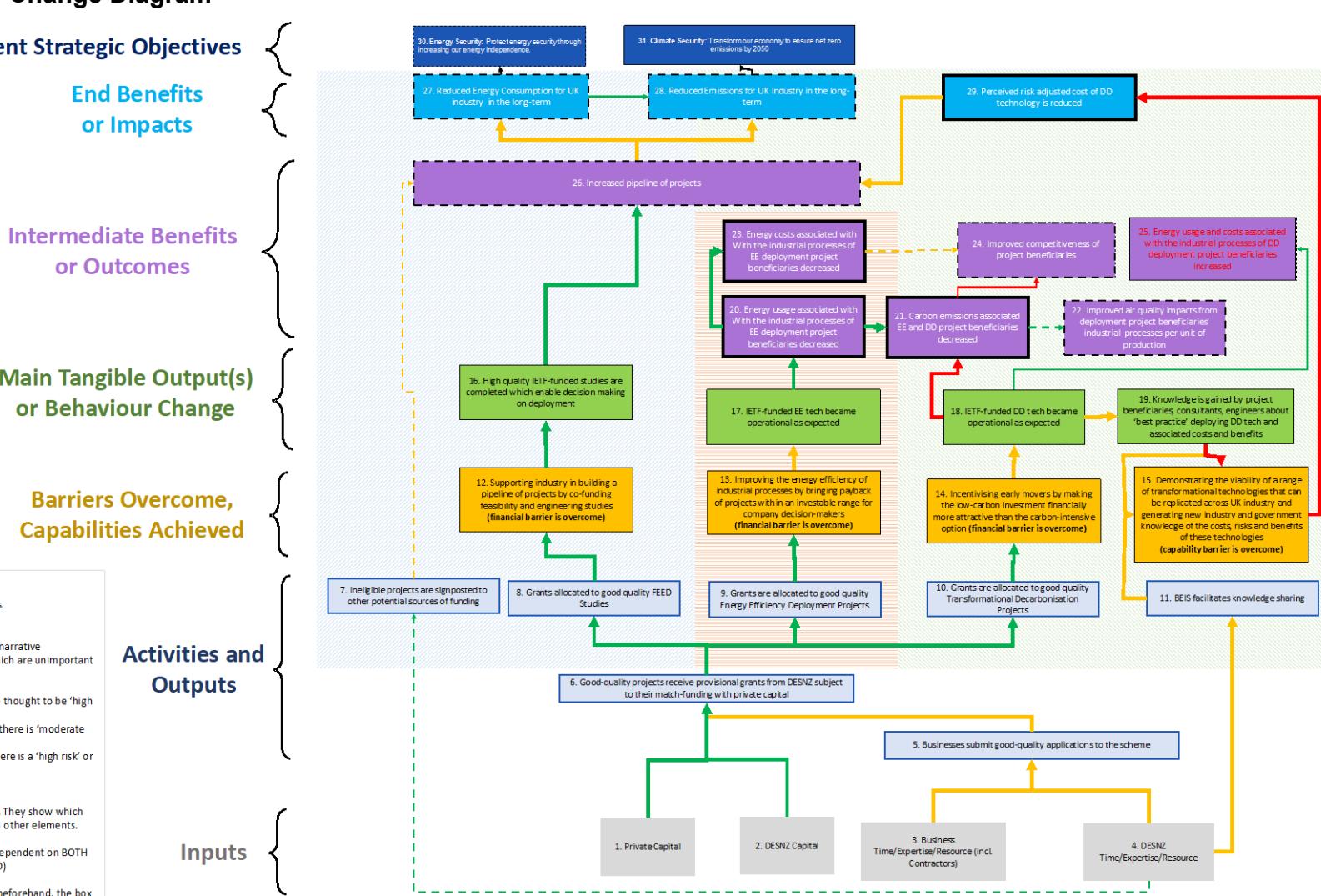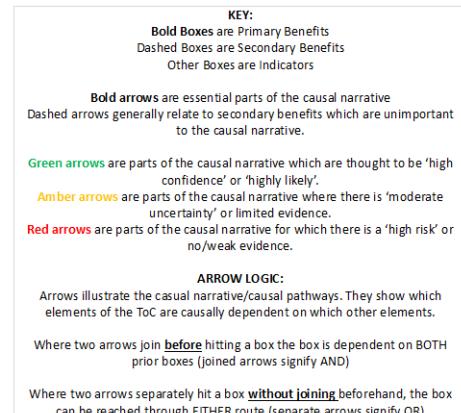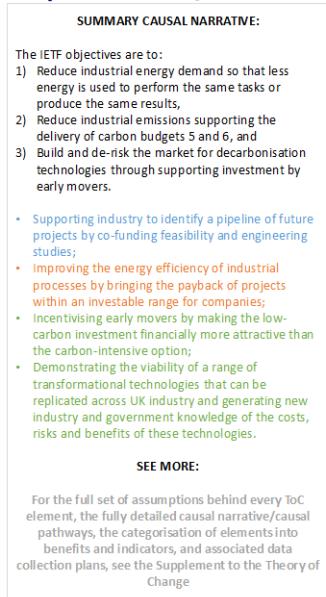
Source: DESNZ

Research Methodology

Annex A provides expanded details on the research methodology, research questions and the evaluation fieldwork. The evaluation was framed by a set of prioritised research questions focused on understanding the performance of key programme processes, the programme Theory of Change, and wider questions such as the programmes alignment with wider net zero policies. An evaluation framework was developed mapping research questions to relevant evidence sources, and data collection tools. The evaluation took a mixed-methods approach to gather and triangulate evidence. Data collection and evidence sources included:

- **Interview programme -** 53 Interviews were conducted – across 6 stakeholder groups – beneficiaries (29), DESNZ delivery team (5), monitoring officers and assessors (10), wider sector stakeholders[8] (6), and dropouts[9] (3). Interviews were c.45-60min semi structured consultations, using interview guides and conducted via online video calls.

- **A beneficiary survey** was sent to all grant holders. 36 responses were completed. The survey was conducted using an online survey portal, Smart Survey[10]. DESNZ directly supported engagement by sending reminders.

- **Document analysis** – Documents[11] were reviewed by study team members as part of project mobilisation/ onboarding; to inform research tool design; and as part of project level familiarisation prior to interviews with specific stakeholders.

Data was then arranged in a coding framework to enable a structured analysis and triangulation of each research question.

The study faced some limitations including:

- A lower than expected survey response (c.30% of 103 eligible organisations) affected the ability to draw generalised conclusions. This was partly mitigated by triangulating evidence from qualitative interview data and programme data.

- A high representation of beneficiaries within the overall sample frame. This was partly mitigated by triangulation between interview responses of different beneficiary types, different stakeholder groups and survey responses. However, the over-representation of beneficiaries was also often useful as much of the process evaluation focus is on the "user perspective".

- A lack of counterfactual group for comparison, beyond the three withdrawn applicants who were interviewed. However, this limitation was less critical for the process evaluation and will be addressed in the impact evaluation.

- Data collection on spillovers of knowledge and technology adoption was limited to interviews with beneficiaries and a small sample of wider industry stakeholders. The

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[8] Wider sector stakeholders were typically representatives with industry trade bodies.
[9] Dropouts are defined as applicants who were successful in their applications but withdrew their applications prior to grant award.
[10] https://www.smartsurvey.co.uk/
[11] Documents reviewed include: programme business cases, the IETF programme delivery database, examples of M&V plans, timelines of scheme windows, and applicant guidance documents.

impact evaluation will attempt to broaden the data collection scope to capture wider effects.

Process Evaluation

Summary Findings

Attractiveness and design of the IETF offer

- IETF is an attractive offer, supporting implementation of mature technologies at scale.

- Most responses indicate that projects would not have gone ahead without IETF support. The fund filled a gap in capital expenditure support for these energy efficiency and decarbonisation initiatives, allowing companies to take on more risk with feasibility studies and non-core technology projects.

- Grant funding provides support to organisations in creating business cases to invest, accelerating deployment of more efficient and low-carbon technologies.

Application process

- Beneficiaries indicated that the majority found the application guidance and support to be helpful and good quality and most relied on the guidance notes closely as well as email clarifications.

- Beneficiaries cited time and resource constraints as a primary barrier to applying, particularly affecting smaller applicants.

- Beneficiaries highlighted a high level of application administration burden (i.e. a large amount of information was required at application stage).

- Linked to the high level of application administration burden, there was a high reliance on consultants to support with bid preparation.

Assessment, due diligence and pre-application support

- Shortening award timelines of 6-9 months was identified as a key area for improvement.

- Beneficiaries found the assessment criteria to be clear and consistently applied, though assessors found the complex scoring criteria challenging to apply. Assessors found the deliverability and additionality responses often lacked detail and would benefit from stronger guidance for applicants on the format and level of detail expected.

- The assessment process, whilst involving multiple participants and detailed scoring criteria, was generally seen as well-structured.

Delivery

- Grant administration has facilitated good project progress across the grant portfolio, however, payment claims and change requests were often seen as somewhat burdensome.

- Support provided by DESNZ and technical contractors was viewed positively by beneficiaries.

- DESNZ and external contractors maintained a good relationship, with contractors providing timely insights into challenges, though some overlap in roles occasionally led to a less efficient delivery.

- Beneficiaries found quarterly progress reviews useful for sharing information and receiving guidance, however delivery team members and Monitoring officers (MOs) reflected that light touch project monitoring led to gaps in the DESNZ understanding of project risks, challenges and likely overspends.

- MOs faced challenges assessing Milestone Payment Claims due to a lack of detail/criteria to confirm eligibility of expenditure and also reported few options to support struggling projects other than extending timelines.

Monitoring & Verification (M&V)

- M&V was often viewed by beneficiaries as useful for tracking performance, and the support provided in developing M&V plans was considered to be good quality.

- There were a mix of views about proportionality, with no clear pattern. Some firms thought the M&V complexity reflected the scale of their project, while other felt it required overly burdensome administration or duplication of existing effort. This indicates a possible need to better tailor M&V plans around project needs and existing M&V efforts, though the IETF programme design already aims to reduce burden on beneficiaries through tailored and cocreated plans.

- A majority of beneficiaries across all company sizes reported that IETF participation led to an increase in M&V activity.

Pathway to Net Zero

- The IETF helps to fill a crucial niche in industrial decarbonisation by lowering payback periods and perceived risk for the deployment of new technologies at scale.

- The study finds that the programme effectively incentivises multinational companies to prioritise decarbonisation investments in their UK subsidiaries, enhancing the UK's competitive position within global corporate structures.

- Strengthening the IETF's role in the UK's net zero strategy could be achieved through process improvements (e.g. streamlined application, payment claims and change requests; longer or rolling grant competition windows).

Applicant journey summary

Figure 2 below is an overview of the applicant journey for Phase 2 of the IETF. The main difference for Phase 1 was that it was delivered by Innovate UK, whereas Phase 2 was delivered by DESNZ with support from external contractors. This overview of the applicant journey synthesises the study team's understanding of the processes in place for the delivery of the programme, and echoes both the structure of the design of the fieldwork, and the structure of this report broadly echoes the applicant journey.

The text below provides a brief description of each stage of the applicant journey.

Programme Launch

DESNZ (ogether with Innovate UK's Knowledge Transfer Network (KTN) (who provided ongoing communications support throughout all phases) held pre-launch and launch activities to promote the scheme to relevant UK industries, to advertise the opportunity, eligibility and competition dates. These activities included online briefing webinars[12] and technology showcases[13] which share examples of funded projects. The promotional launch activities were implemented with each competition phase.

Application and pre-application support

A range of support was available to applicants including an application guidance document[14][15], workshops/clinics, and an email contact for direct clarifications. The application guidance was updated in each phase and competition window. Also available throughout has been the IETF Networking Platform and the Technology Marketplace (provided through KTN) to enable collaboration and networking across different industry stakeholders and an option for stakeholders to book an appointment with DESNZ or KTN. Application windows were open for an average of 3 months (Phase 1.2 ran for 4 months and was the longest window). Applicants were required to create an account on an application portal and submit their applications via the portal.

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[12] https://iuk-business-connect.org.uk/events/industrial-energy-transformation-fund-phase-2-autumn-2022/
[13] https://iuk-business-connect.org.uk/events/industrial-energy-transformation-fund-phase-2-technology-showcase/
[14] Phase 1 application guidance document:
https://assets.publishing.service.gov.uk/media/60212c2cd3bf7f70b7d4f950/ietf-spring-2021-supplementary-grant-award-guidance.pdf
[15] Phase 2 application guidance document:
https://assets.publishing.service.gov.uk/media/66b4b94049b9c0597fdb0cce/ietf-phase-2-autumn-applicant-guidance.pdf

Figure 2 IETF Phase 2 indicative applicant journey diagram[16]
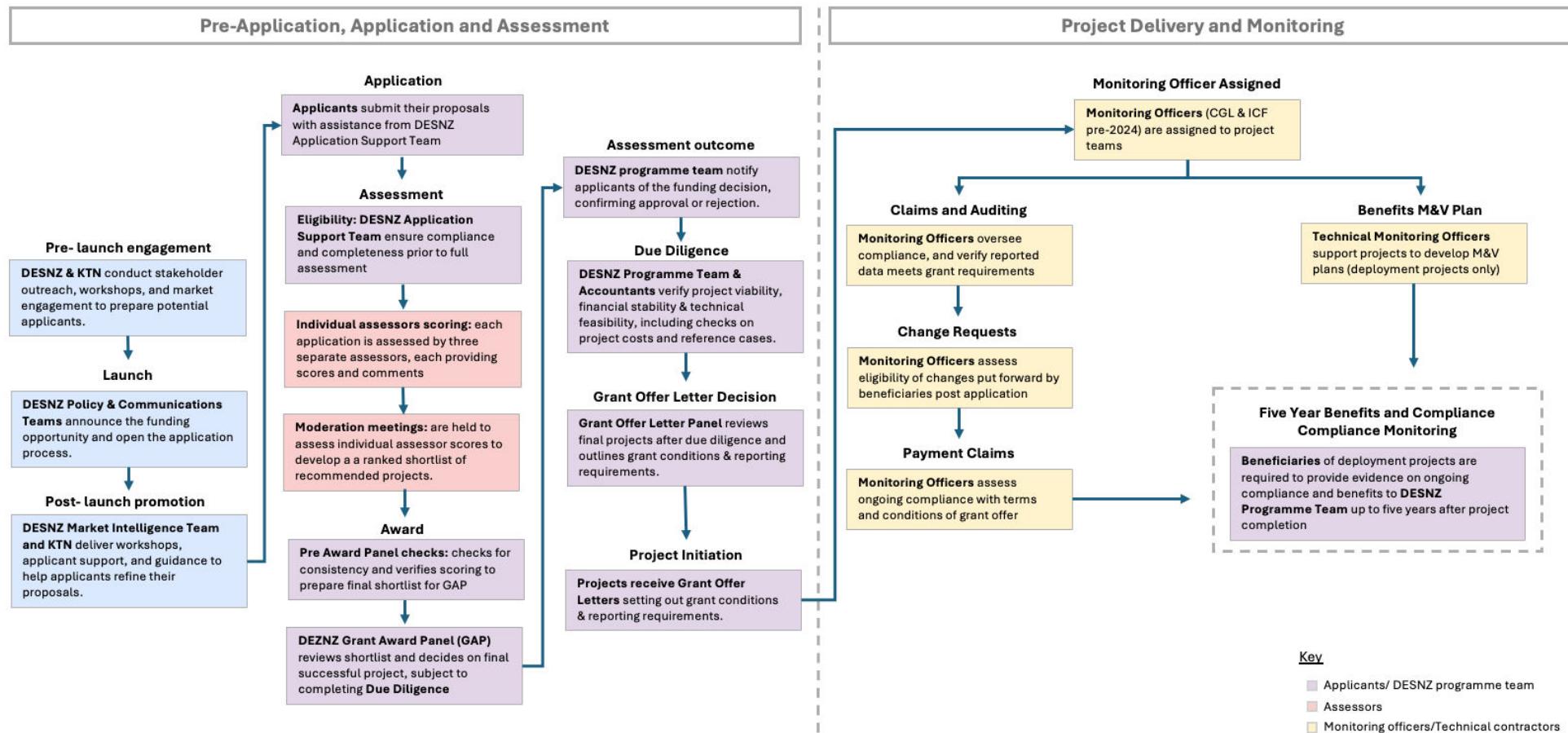
Source: Technopolis, using DESNZ inputs (applicant journey diagrams, and business cases)

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[16] Phase 1 applicant journey was largely the same, however, there were key differences within the assessment and award, which were: 1) eligibility checks were conducted by Innovate UK, 2) technical assessment was done by Innovate UK, 3) Award decisions had an additional Innovate UK Funders Panel, prior to GAP.

Assessment and Due Diligence, through to project initiation

In Phase 1, applications were reviewed by Innovate UK. From Phase 2 onwards, applications were first reviewed by DESNZ assessors for completeness and eligibility. Internal and External Technical assessors then assessed each eligible application against scoring criteria published in the applicant guidance (further detail on scoring criteria is provided in the section on *Assessment Criteria* (page 35). Moderation meetings were then used to ensure consistency of technical and financial assessments. In Phase 2, decarbonisation deployment projects requesting more than £3m and efficiency deployment projects requesting more than £7m could receive an additional Scrutiny Call from DESNZ officials. Assessed applications were then reviewed and compared by a Grant Assessment Panel (GAP)[17], with input from Technical Due Diligence Teams, to develop a final short list of successful applicants. Unsuccessful applicants were then notified and provided with feedback and signposted to alternative sources of funding if relevant. Successful applicants were given feedback on strengthening projects and required to complete technical and financial due diligence. Following successful completion of due diligence, applicants received a Grant Offer Letter outlining the grant conditions and reporting requirements.

Delivery: reporting, claims and change requests

Once beneficiaries signed and returned the Grant Offer Letter, they could begin the delivery of grant funded work. Upon project initiation, all projects were assigned a Monitoring Officer (MO) either based within DESNZ or within an external contractor. MOs supported beneficiaries with claims and compliance. As part of the claims and compliance process, beneficiaries attended Quarterly Review Meetings with MOs to review project progress and discuss any support needs relating to grant administration and delivery. MOs were also available to respond to queries and provide support throughout. In Phase 1.1, beneficiaries could submit payment claims at any time following eligible expenditure. In later windows, beneficiaries were required to submit quarterly payment claims to be reimbursed for eligible expenses. If projects did not run to plan, as per application budget and workplans, beneficiaries were required to notify the MOs. If deemed necessary by MOs, beneficiaries were required to submit a Project Change Request to receive formal agreement which may have included revised project plans. In Phase. 1 there were 49 Project Change requests, of which 40 were approved and 2 were rejected (the remaining were withdrawn or undetermined at the time of study). In Phase 2, there were 48 Project Change Requests, of which 34 were approved and 3 were rejected (the remaining were withdrawn or undetermined at the time of study).

Monitoring and Verification (M&V)

In addition to MO's, deployment projects worked with Technical MOs (based exclusively within external contractors) to develop Monitoring and Verification (M&V) plans. During the due diligence phase, deployment projects worked with Technical MOs to develop tailored M&V plans which set out how energy and emission reduction performance would be monitored.

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[17]In Phase 1 there was an additional Innovate UK Funders Panel prior to GAP.

M&V also tracks project performance against the goals and baselines stated in their applications.

Benefits Monitoring has yet to start for all projects. Following project completion (when EE and DD technologies are installed), a 5-year Benefits Monitoring period commences in line with M&V plans. M&V data feeds into the overall programme benefits monitoring, to track performance and value for money against the policy objective. Study grants are not required to carry out M&V.

Attractiveness and design of the IETF offer

Attractiveness of the IETF offer

The majority of beneficiaries interviewed and surveyed, across all company sizes and grant types, viewed the offer of the IETF positively. The key aspects that made it attractive are summarised below:

- The IETF was viewed by some beneficiaries as filling an important niche not met by other net zero programmes, by supporting deployment of relatively mature technologies at scale which firms cannot fund themselves. Other programmes, such as the Industrial Fuel Switching Programme[18] and the Industrial Energy Efficiency Accelerator (IEEA)[19] are innovation focused grants.

- The level of funding available and the matched funding requirement, was generally viewed positively by beneficiaries in interviews, but indicated to be a moderate barrier by some smaller firms in the interview data. Beneficiaries in Wales reflected that their lower matched funding requirement added to the attractiveness of the offer[20].

- All beneficiaries stated that without IETF support, their projects would either not have progressed or progressed at a significantly slower pace and smaller scale – indicating a positive case for additionality, albeit self-reported[21]. The majority of beneficiaries reported that their project ideas existed in some form prior to the IETF but were said to not be able to move forward without grant support. The study does not have a robust counterfactual for comparison, however, all three withdrawn applicants who were interviewed reported that their projects have not progressed.

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[18] https://www.gov.uk/government/publications/industrial-fuel-switching-programme-successful-projects
[19] https://www.gov.uk/government/publications/industrial-energy-efficiency-accelerator-ieea
[20] Deployment projects in 'Assisted areas' receive a subsidy intensity uplift of 15%
 (A) and 5% (C): https://assets.publishing.service.gov.uk/media/66b4b94049b9c0597fdb0cce/ietf-phase-2-autumn-applicant-guidance.pdf
https://assets.publishing.service.gov.uk/media/5a74c1b5ed915d4d83b5eb52/bis-14-701-2014-to-2020-Assisted-Areas-Map-Governments-Response-to-the-Stage-2-Consultation-revised.pesra
df https://assets.publishing.service.gov.uk/media/5a74c1b5ed915d4d83b5eb52/bis-14-701-2014-to-2020-Assisted-Areas-Map-Governments-Response-to-the-Stage-2-Consultation-revised.pesradf
https://assets.publishing.service.gov.uk/media/5a74c1b5ed915d4d83b5eb52/bis-14-701-2014-to-2020-Assisted-Areas-Map-Governments-Response-to-the-Stage-2-Consultation-revised.pdf
[21] Evidence of additionality will be assessed more completely in the planned interim and final impact evaluations, including through quantitative analysis of counterfactuals and M&V data.

- Most beneficiaries stated in interviews that the IETF accelerated and enabled their decarbonisation and energy efficiency ambitions and plans by accelerating implementation. However, it was generally stated that the IETF did not increase the ambition of decarbonisation targets. For example, one large firm carrying out a feasibility study on Carbon Capture and Usage (CCU) described how their firm's decarbonisation strategy has multiple pathways and the IETF has enabled them to fund multiple feasibility studies which has supported delivery of their existing strategy.

Applicant Motivations

Financial motivation was consistently reported in beneficiary interviews as the primary motivation across all project types and company sizes. Financial motivations included:

- Lowering energy costs through deployment of more efficient equipment (primarily for EE deployment projects).

- Bringing technology payback times within an investible range.

- De-risking and incentivising the allocation of capital expenditure (CAPEX) and research and development (R&D) budgets for "non-core" technologies in UK subsidiaries of multinational group structures.

- Resourcing personnel time to focus on "non-core" engineering works.

Decarbonisation was a closely linked secondary motivation across the majority of beneficiaries. Larger firms frequently reported strategic decarbonisation targets as a motive which was closely interlinked with financial motivation – through market incentives of consumers seeking lower carbon products, managing longer term policy risks (such as increasing UK Energy Trading Scheme [ETS][22] carbon prices), and ensuring their eligibility for government service contracts. Small and Medium Enterprises (SMEs) also often had decarbonisation aims, but these motivations appeared less frequently and prominently than for larger firms.

Survey data (see Figure 3 below) supports the prominence of financial motivations listed above, with **76%** of respondents stating that without IETF support, long payback periods were a barrier to progressing their projects. Furthermore, **93%** stated a lack of funds was a significant barrier to project development.

The prominence of financial motivation is set in contrast to the relatively low prominence of technical knowledge as a barrier to progressing projects without IETF support. The majority of beneficiaries reported in interviews (and echoed by **59%** of survey respondents) that they generally possessed the in-house technical capability to deploy projects, but did not have sufficient personnel time or CAPEX available. This finding is to be expected as the assessment criteria requires that projects possess the capacity needed to implement their projects.

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[22] https://www.gov.uk/government/publications/uk-emissions-trading-scheme-markets/uk-emissions-trading-scheme-markets

The influence of energy price rises on applicant motivations followed a clear pattern based on project type and phase. Given the timing of the energy prices rises during winter 2022/2023[23] they were rarely a motivating factor among Phase 1 projects but were frequently cited as a key motivating factor for Phase 2 energy efficiency projects.

Figure 3 Project development barriers faced by beneficiaries prior to involvement with IETF

Q8. What barriers to project development did you face prior to your involvement with the IETF?
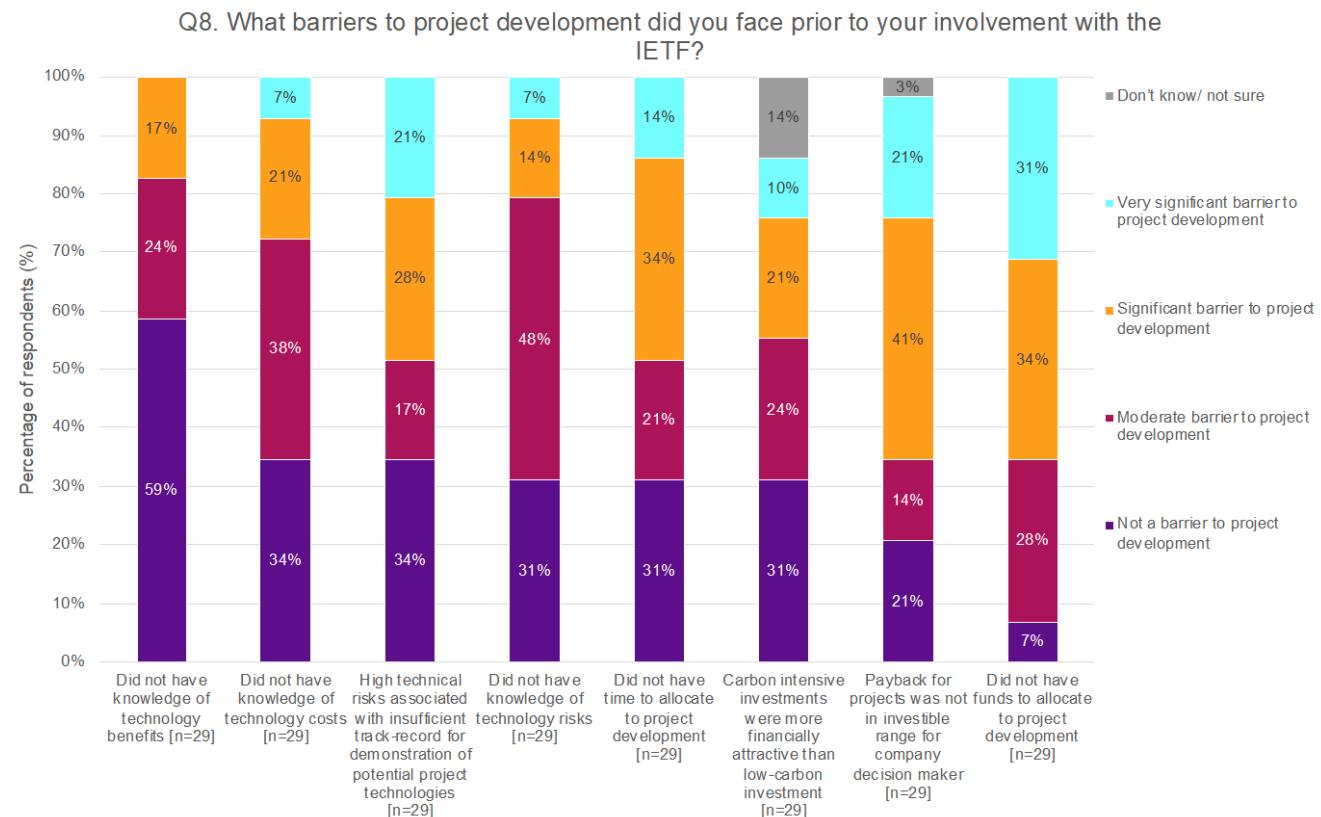
Source: Technopolis survey

Furthermore, energy prices were not reported as important motivating factors for decarbonisation projects, namely hydrogen and CCUS projects, in either Phase 1 or Phase 2. Rather, projects said that business cases associated with these investments were motivated by longer-term decarbonisation strategies.

An interesting effect of the energy price rise in 2022 was reported by one decarbonisation deployment project using heat pump technology funded in Phase 2.1. In this case, electricity price increases nearly undermined the cost benefit model of their project as diesel became *relatively less expensive* compared to electricity during the price peak. However, as prices stabilised the electrification project payback period remained viable. This is confirmed during assessor interviews as a pattern seen in other projects.

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[23] Further details of average fuel prices purchased by manufacturing industries can be found here: https://www.gov.uk/government/statistical-data-sets/prices-of-fuels-purchased-by-manufacturing-industry

The influence of Covid-19 on applicant motivations was not reported as a significant factor by beneficiaries. However, energy price rises are partly a function of the global economy re-opening following pandemic lockdowns – therefore energy price effects are partly attributable to Covid-19. Many beneficiaries said that they were able to continue operating throughout the pandemic and that it had little impact on their operations.

The relatively low levels of application to the IETF in Phase 1 may also reflect a reticence towards investment among companies because of the post-Covid-19 period of inflation and higher borrowing costs. However, the lower application rate may also reflect the lack of visibility of the fund at an early stage.

There is a limitation in the study's ability to understand reasons for not applying as a result of broader economic factors, as non-applicants were not a targeted stakeholder group. However as noted again further below, one withdrawn application provides a data point, where a brick manufacturer withdrew their application due to changes in the housing market as a result of higher interest rates.

An additional external market factor highlighted by one beneficiary was that market and policy demand for decarbonised products and industries accelerated at a similar time as the pandemic. A landscape review of market and policy demand was beyond the scope of this study; however this broader demand would strengthen the overall motivation industrial decarbonisation and therefore the technology subsidy support provided by the IETF.

Barriers to Application

The IETF was generally seen by beneficiaries as an attractive offer but there is an obvious selection bias present in this group. While the offer was seen as broadly attractive, beneficiaries did note some barriers to applying which are described below.

Time and resource intensiveness of applications: a majority of beneficiaries viewed the amount of time and information required to complete applications as a barrier. This was frequently expressed in interviews and confirmed by survey data. Figure 4 below shows that **66%** of survey respondents (n = 29) viewed the amount of information required as a barrier.

Figure 4 Enablers and barriers for application to IETF

Q9. To what extent did the following factors affect your application to IETF? How appropriate was the...
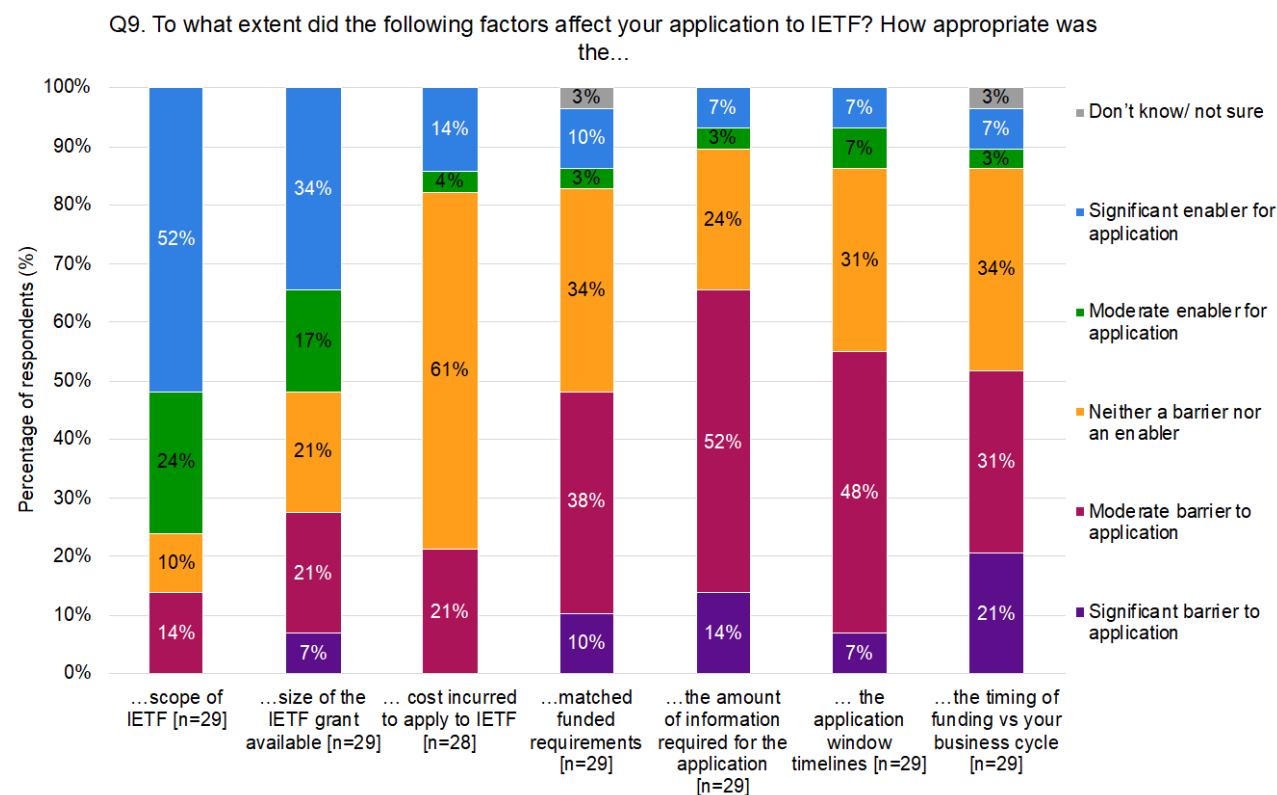
Source: Technopolis survey

This view was broadly consistent across project types and company sizes, though larger firms were less likely to view personnel time as a barrier due to greater in-house capacity and greater resources available including funding for consultants. As discussed further below, assessors agreed there was a high volume of supporting documentation, which was complex and resource-intensive for applicants.

Intensive grant administration: A small number of beneficiaries reflected that they would be cautious about *re-applying*, given what they viewed as a relatively intensive application and grant administration detracting from the value of the grants. As one beneficiary described, the grant was valuable and there were positive aspects to the programme delivery, however there is room for improvement and greater efficiency:

> *"Yes, we've been paid £90,000…but then some people say to me afterwards…you spent a lot of time on that, would you do the grant again? […] There's room for improvement, it wasn't terrible, but there's room to optimise and save time on both sides" – Decarbonisation feasibility study beneficiary*

Timing of competition windows: Challenges relating to timing were highlighted as barriers to applying by a range of beneficiary types. Supporting trends observed in the beneficiary interviews, survey data found **55%** of survey respondents (n = 29) viewed the application window timelines as a barrier, while **52%** viewed the timing of funding versus their business cycle as a barrier. Three types of barrier related to timing were identified:

- The duration of competition windows, which were typically two months[24], were seen by some as too short for a project developer to develop a project plan and provide high quality information within their application. One large CCU feasibility study beneficiary reflected that 10 months would therefore be a better application window. Interviews with successful applicants who withdrew from the process all cited challenges related to the short duration of application windows as barriers to applying. The study team acknowledges, however, that long lead times such as this would lead to unnecessary delays for other projects that could provide a submission in a short time-period. The issue of short application windows partly links to the regularity and intervals of the IETF. Some beneficiaries reflected in interviews the importance of ensuring windows are predictable with consistent eligibility and assessment criteria – so that companies can plan and prepare future bids. While phases 1 and 2 of the IETF have been delivered in regular intervals with Spring, Summer and Autumn competitions, this finding highlights the importance of ensuring regularity and predictability with clear communications and signalling by government. Interviewed beneficiaries and wider industry stakeholders reflected that the IETF lacks clear longer-term policy commitment, making it hard to predict and base future plans around.

- The timing of competition windows was sometimes viewed as misaligned to, or dictating the cadence of project plans and businesses strategies, which otherwise might be able to progress quicker if projects were not reliant on IETF funding. This was confirmed in the survey data with **52%** of respondents citing the alignment of funding with their company business cycle as a barrier to application. For example, one company described that if they are planning multi-stage engineering work from feasibility through to deployment but are dependent on IETF grant funds, the stop-start nature of IETF windows means they have to design their work around this funding cycle. Another company hoped to apply to the IETF for support with an energy efficiency upgrade, but one of their main clients needed them to progress the work quicker than IETF windows would allow. Suggestions were therefore made by beneficiaries for the IETF to operate as a continuous or year-round competition.

- The length of time from award notice to being able to commit funds shortened project delivery timelines which, in some cases, undermined the business case. For example, a large cold-chain logistics operator had to delay the pace of engineering work because the IETF would not allow them to progress work 'at risk' prior to a signed grant offer letter[25]. Multiple beneficiaries therefore suggested to permit spending at risk at an earlier stage within the grant contracting process or to shorten Grant Offer Letter timelines.

Separation of the scheme into Energy Efficiency and Decarbonisation projects

Beneficiary interviews generally found that the separation of the scheme into Energy Efficiency (EE) and Decarbonisation (formerly known as Deep Decarbonisation [DD]) pots had minimal

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[24] https://assets.publishing.service.gov.uk/media/66b4b94049b9c0597fdb0cce/ietf-phase-2-autumn-applicant-guidance.pdf For example, the applicant guidance for IETF Phase 2 Autumn 2022 states that the competition window ran from 27 September 2021 to 06 December
[25] Proceeding at risk was allowed by special arrangement for some P1&2 projects

effect on their applications because they felt it was clear which type of technology they were applying for, or the division was generally helpful because it helped to focus project scope. This is supported by survey data shown below in Figure 5 which shows that that the scheme separation was generally attractive and supportive of deliverability to survey respondents.

Assessors had more mixed views about splitting the fund between EE and DD, and between studies and deployment projects. Assessors generally reflected that separating the scheme was helpful as it enabled more targeted guidance to applicants. This resulted in more targeted applications with better clarity and enabled assessors to decide which types of assessors were needed for different projects (e.g. more technical vs more generalist).

However, some assessors reflected that separating studies from deployment projects was a more helpful distinction than EE/DD as studies and deployment are very different types of projects requiring different forms of support. Whereas separating the scheme into EE and DD projects was seen by some assessors as potentially confusing for beneficiaries because some projects might be eligible for funding from both schemes. As the EE and DD strands were allocated at different matched funding rates, this may have directed which scheme applicants applied to.

To support better coherence between the type of applicant and matched funding rate available, a suggestion was made by one assessor to separate projects by TRL, or to look for ways to better separate projects by risk factors other than EE vs DD. For example, a standalone category for hydrogen projects which are lower TRL, more costly, and higher risk than many other eligible technologies.

Figure 5 Role of separating programme into Energy Efficiency and Decarbonisation strands

Q19. How far do you agree that the separation of the programme into separate strands delivering Energy Efficiency and Decarbonisation (formerly known as Deep Decarbonisation) … [n=30]
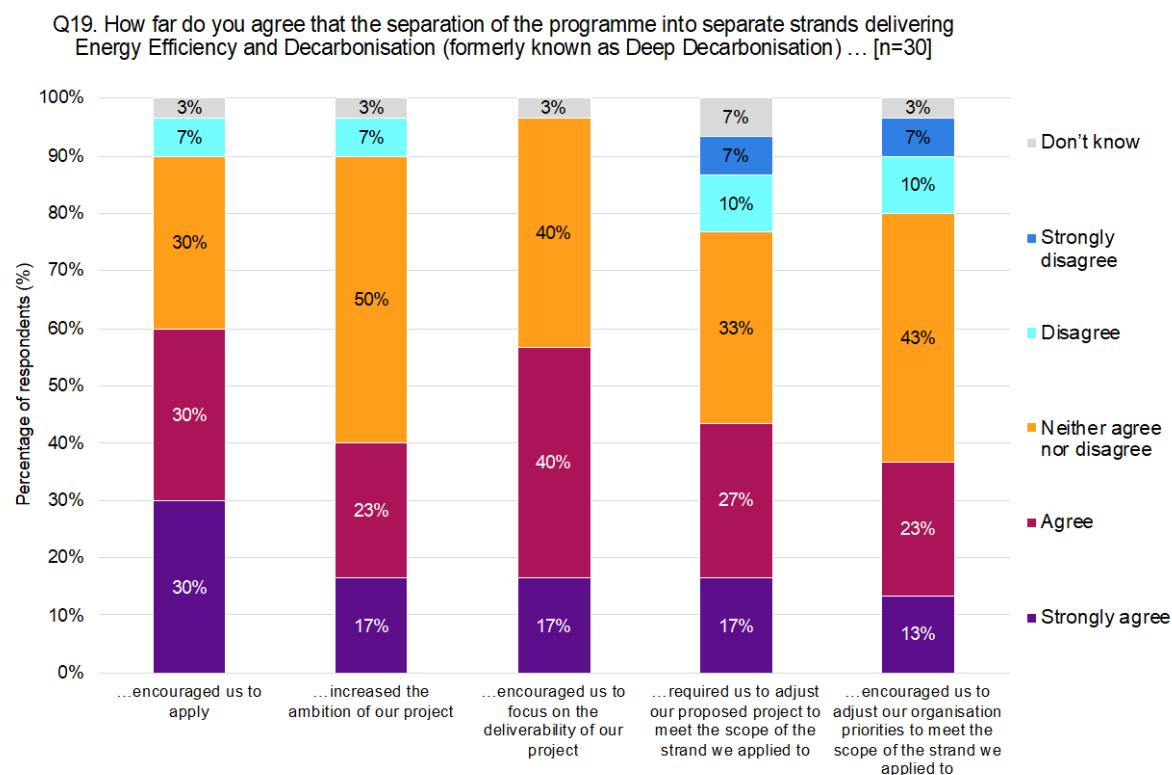
Source: Technopolis survey

Application Process

Pre-application and marketing communications

The IETF engaged in marketing and communications activities to promote the launch of the programme including digital communications, applicant briefing events, technology showcases, and industry association events.

The DESNZ delivery team reflected that when they launched the marketing for first funding windows, they received many clarification questions suggesting a lack of clarity among industry stakeholders. However, the delivery team expressed that they worked to improve communications and marketing messaging in each competition windows and messaging became more targeted and better at communicating the offer of the IETF. This improved communication and marketing, combined with momentum generated from increased familiarity across industry, has led to increasing numbers of applications. The process for improving the communications through the rounds of IETF is exemplified by a delivery team stakeholder:

> *"We initially started off doing lots of comms, providing lots of information and getting lots of very noisy questions back and having quite limited capacity to kind of filter those and provide support and over time standard of our outward comes, I think we became better, we provided more targeted messages, people became more familiar as well with the fund overall" – Delivery Team stakeholder*

The delivery team recognised that given the IETF is still undersubscribed (as described in *Theory of Change Assessment*), there are likely still many relevant companies and stakeholders who may still not be aware of the IETF opportunity. This suggests there are gaps in the sectors that programme communications and marketing are yet to reach. One suggestion for improvement by a delivery team member was to increase the number of technology showcases and the marketing around these events to reach a wider group of potentially interested organisations.

Beneficiaries reported being made aware of IETF through the following primary channels: direct communications from DESNZ; communications from trade bodies and industry associations; proactively keeping up to date with new government schemes and sources of funding; and outreach from consultants (both grant writing specialists and those with technical specialities).

Application guidance and support

Evidence from beneficiaries indicates that the majority found the application guidance and support to be helpful and good quality, with most drawing on a range of forms of support, primarily: the guidance document, briefing events, workshops, and DESNZ email contact. Figure 6 below shows that a variety of DESNZ activities supported beneficiaries to write a quality application, including **57%** of respondents citing the guidance documents. Small and

medium sized companies, as well as consultants, also emphasised the value of the email clarification service for additional advice on their specific technology and context.

Figure 6 Usefulness of resources for helping to write IETF application

Q26. How useful did you find the following resources for helping you write your application for IETF?

	Extremely useful	Very useful	Useful	Somewhat useful	Don't know	Did not use resource /NA
Guidance documents [n=30]	20%	37%	20%	7%	3%	13%
Questions with Responses (FAQ) [n=30]	7%	40%	20%	13%	3%	17%
Email support [n=30]	7%	23%	27%	13%	7%	23%
IETF capacity support via the inbox and eligibility checks [n=30]	3%	23%	13%	13%	7%	40%
Consultants [n=29]	28%	17%	7%	7%		41%
Knowledge sharing events [n=30]		23%	7%	17%	10%	43%
Other third-party support [n=28]	4%	21%			7%	68%

Percentage of respondents (%)

Source: Technopolis survey

Beneficiaries reported positively against the application guidance in all phases, which suggests work done by the delivery team to iterate and improve the guidance documents after each phase was successful.

Applicant interviews revealed that in some cases, there was a reliance on external consultants to complete, or substantially support, their applications. This was mainly to fill gaps in personnel time capacity, but also engineering expertise and to leverage consultants' prior experience of IETF and other grant applications. These findings were supported by survey data where over half of respondents (n=30) used consultants or another form of third-party support, such as industry associations who provide grant writing capacity. Figure 6 above shows that where consultants were used (they were not used by **41%** of survey respondents), they were considered integral to supporting to write applications (**52%** found consultants useful).

The functionality of the application process and support is also discussed in the Theory of Change chapter (page 52).

Time and resource required to complete applications

As outlined previously, the majority of beneficiaries across all company sizes and grant types reported that the application process was time and labour intensive, while expertise or knowledge were less frequently seen as capacity barriers. The amount of time and resource required seems to have fallen disproportionately on smaller organisations.

Larger beneficiary companies and holders of large grants were more likely to report that the application was reasonable in terms of level of effort and that it was well designed, compared

with similar funds such as Industrial Strategy Challenge Funds (ISCF)[26] and previous Innovate UK grants. A significant number of large companies and grant holders, however, reflected in interviews that the application seemed geared to a larger grant. Smaller beneficiary companies consistently reported that they found the application time and labour intensive. For example, one medium sized company who received a £40,000 grant for an EE feasibility study said the application seemed more appropriate to *"£700,000-£800,000 grant"*, based on their previous experience of Innovate UK grants. This viewpoint was supported by an application assessor who shared a similar view that the application is complex *"even in comparison to other funds and similar amounts of money"*. Some beneficiaries therefore suggested that the application requirements could be scaled to reflect grant size.

Beneficiaries often described the time requirement of the application as being *"hard to do alongside day jobs"*, while one consultant stated that the grant application that he supported took as much as 400 hours to complete for a Phase 2 c.£300,000 deep decarbonisation deployment grant. In particular, this consultant highlighted challenges around developing financial counterfactuals. They also cited challenges in early competition windows with the application portal user interface but stated that the portal improved significantly in later windows, reducing the amount of time required.

Many beneficiaries reflected that the Phase 2 application was more time intensive than Phase 1, as it required more information and had what they considered to be substantial duplication. As one consultant who supported a beneficiary application and ongoing project implementation said, *"there are now many questions with very subtle differences, so as an applicant you have to be very careful to make sure answers to these 100 or so subtly different questions are consistent and aligned"*. The same consultant reported that *"the new format [phase 2, compared to phase 1] increased [application] cost for their client by **60-70%**"*. Assessors reflected that the IETF application requests a large volume of information and after Phase 1, applicants were required to submit more supporting evidence. While assessors recognised this challenge for applicants, they felt on balance that the information requested was necessary to properly assess projects and manage risk of non-delivery.

Complexity of application

The delivery team indicated that efforts had been made to improve the application process to be simpler and more accessible to ensure that SMEs would not be disadvantaged. These measures included additional pre-application information and direct support by email.

Interviewed beneficiaries typically reflected that the application was not challenging from an engineering or technical perspective, with the main barrier being related to the volume of information requested.

However, one challenge often highlighted by small and medium sized beneficiaries in interviews was demonstrating additionality, including quantifying potential cost savings,

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[26] https://www.ukri.org/wp-content/uploads/2023/09/UKRI-041023-ISCF-ProcessEvaluationReport.pdf The process evaluation of ISCFs states that application windows were too short

developing counterfactuals, developing and measuring baselines to prove that the project would not go ahead otherwise.

One consultant who had supported multiple feasibility study applications reflected that the Phase 1 application which was managed by Innovate UK seemed to have a greater emphasis on innovation, which seemed misplaced given the fund's high TRL focus. The consultant presumed this innovation focus was habitual for Innovate UK, and that the application has become more appropriate (i.e. not so innovation focused) since being managed by DESNZ.

Application template

The application template and application portal were considered to have become easier to use throughout competition phases. The IETF delivery team expressed they were aware of earlier issues created by the application portal, and they worked to improve it in later application phases of the fund.

Most of the issues described below are understood to now have been addressed through iterations from Phase 1 to Phase 2, apart from the issue of duplication of application questions. Initial issues highlighted during interviews, which have now been rectified, included:

- Portal security authorisation in earlier phases was not user friendly for teams working on the same application and required management of multiple authentication links, produced each time an application was saved and closed. In later rounds a simpler email authorisation has been used which some beneficiaries reported as being preferred.

- Functionality for users has improved since earlier phases enabling easier uploading of content, saving progress, editing previous content, and navigating backwards and forwards through pages. The delivery team confirmed this was in part caused by the SmartSurvey platform that was used for the application, which is normally intended for surveys rather than applications.

- In earlier phases the application did not accept information that was specific to Northern Ireland e.g. MPRN (meter point reference number[27]), which has since been corrected.

- Some applicants reported that they were not able to easily refer to previous answers when faced with duplicated questions or topics, in part because the question numbers in the Microsoft Word template for the application were not aligned to the portal question numbers. The need to cross reference in this way also opened room for human error in remembering question numbers.

Assessors reflected that a standardised project plan template could make applications more standardised and clearer to applicants what level of detail is expected.

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[27] https://www.nienetworks.co.uk/mprn

Application withdrawals

The study included three interviews with withdrawn applicants (applicants who were successful within the application stage but did not go ahead with their grant funded projects). These interviews provided some insight on reasons for withdrawal:

- Changes in business case viability due to macroeconomic conditions, for example one company described how their project became unviable due to interest rate rises suppressing the house building market.

- Two companies referenced mergers and acquisitions, affecting the strategic case for their projects.

- One company also described that the grant contract terms required the lead applicant to bear responsibility for the performance of academic partners, which the lead applicant company was unwilling to commit to.

Assessment, Due Diligence and Award

Assessment criteria

Deployment projects are assessed against the following criteria[28]:

- Economic Assessment: value for money for His Majesty's Government (HMG) and society, which includes a project benefits calculator to assess energy and cost performance of different fuels and technologies against a baseline.

- Transformational Assessment: compatibility with HMG's Net Zero commitments.

- Deliverability Assessment: ability to successfully deliver projects, including proposed plan, team and project management.

Within the assessment criteria are sub-criteria (such as additionality and scalability). Each sub-criterion is assessed on a scale of 1-10.

Studies are assessed against technical feasibility, potential for carbon and energy savings, study cost/Value for Money, added value and replicability.

A majority (77%) of surveyed beneficiaries agreed that the assessment criteria were clear, based on the information provided in guidance documents. Beneficiary interviews also confirmed that the assessment criteria were clear based on the guidance provided, and the assessment criteria were considered to be consistently applied. However, this data source does reflect an inherent bias towards applicants who were successful.

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[28] IETF Phase 2 Applicant Guidance:
https://assets.publishing.service.gov.uk/media/66b4b94049b9c0597fdb0cce/ietf-phase-2-autumn-applicant-guidance.pdf

The functionality of the assessment is also discussed in the Theory of Change chapter (page 52).

Assessors generally reflected that the assessment criteria were suitably designed and applied, to enable a critical appraisal of technical risk and project benefits, ensuring good quality grants and investment of public money.

However, assessors also typically reported that the assessment criteria was complex and at times challenging to apply. Technical assessment criteria (within the economic and deliverability assessments) were often seen as easier criteria to assess because the evidence was more objective, such as TRLs and associated technical risks, and emissions/energy performance. Transformational potential and additionality, on the other hand, were harder to assess because answers were sometimes subjective, and contribution to these goals is complex and multifaceted.

Some assessors reflected that applicants would likely have benefited from more guidance on how criteria would be marked. For example, in the assessors' views, applicants struggled to demonstrate additionality and suggested that more evidence could have been provided. Some beneficiaries also reflected a similar view as they were unsure how to demonstrate that their projects would not have gone ahead without the IETF. Similarly, one assessor suggested that applicants would benefit from clearer guidance about the level of detail that is expected on deliverability plans, as they were often poor quality. Applicants often provided details only at a high-level, and therefore were challenging to assess.

One assessor reflected that applicants would often have benefited from first applying for a feasibility/study grant, then using the evidence generated through to the study as the basis for a deployment application.

One assessor also reflected that it was challenging to balance trade-off between novelty and technological risk. In combining these scores, assessors were encouraged to look at projects 'holistically' – to take a balanced view on the competing criteria.

Another assessor highlighted that the *net benefit calculator* was a particularly helpful tool for assessing how the balance the additionality and technical risk scores affected their net benefit score. However, it was highlighted that the net benefit calculator did not return any positive net benefit scores for hydrogen projects. To account for this misalignment between the calculator assumptions and the programme additionality aims, hydrogen projects received a further qualitative assessment at the GAP stage, to assess the additionality benefits as a contribution to the policy objectives.

The scoring scale of 1-10 for each sub-criteria was also regarded by some assessors as adding complexity when comparing and moderating differences in scores, whereas a scale of 1-5 was reported to be a more typical scale for similar competitions.

Assessors described that for 'sister projects' (where a company submits multiple similar applications at multiple sites), the same assessors were used to ensure consistency of judgement against the assessment criteria, which was regarded as an effective strategy.

Assessment structure and award decision making

The delivery team and assessors generally agreed that the assessment structure and award decision process was robust. In both Phase 1 and Phase 2, less than half of all applications were awarded, demonstrating a rigorous application of the award criteria.

Moderation meetings were widely regarded as useful by assessors. Assessors reported that generally, different assessors who review the same applications were "within a few marks of each other" suggesting a good level of consistency between assessors, however some applications had significantly different scores leading to extensive moderation discussions to arrive at an agreed score. In some cases, different scores were given as assessors possessed different forms of expertise (e.g. technical, commercial and programme delivery expertise). However, through the process of moderation, this diversity of expertise was viewed as positively contributing to balance and overall decision making in line with IETF objectives.

To strengthen the moderation process, one assessor suggested that including an independent moderator would be a useful addition to remove any bias toward the lead assessor's original assessment of project.

Scrutiny calls for grant requests above £5m were regarded as useful as these carried more risk and sometimes needed additional supporting evidence. However, one assessor indicated there was an inconsistency with scrutiny calls[29], and that not every window of every phase included scrutiny calls, though these were re-introduced in later phases for larger projects. One suggestion for improving the use of scrutiny calls was to lower the scrutiny threshold from £5m to £2m.

The Grant Award Panel structure was recognised by assessors and the delivery team as a good structure to ensure a balanced portfolio of grants in line with the programme aims, as well as providing additional quality assurance for assessments. One reflection of an assessor, however, was that the Grant Award Panel was somewhat opaque in its final judgements, which could be improved through a more detailed description of the rationale for the Panel's final decisions.

Assessors identified a trend regarding the quality of applications, whereby larger companies tended to submit higher quality applications, and SMEs tended to perform better only when supported by a consultant or paired with a partner or a university. While the delivery team reported that changes had been made to the application guidance and support to make the application more accessible to smaller companies, a trend of lower quality applications from SMEs persisted in later competition rounds suggesting that larger companies still had a competitive advantage.

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[29] Additional Scrutiny Assessment Process enabled the department to undertake a discretionary process to mitigate risk. Projects requesting grant funding above certain thresholds could be asked to take part in a phone call with assessors to gain a clearer understanding of the information provided in the application form.

Due diligence and contracting

Successful applicants received award notices, and then are required to complete due diligence and address any post-application queries before receiving a final signed Grant Offer Letter. Beneficiaries reported mixed experiences of the post-application and due diligence process, with **57%** (n=35) finding it supportive to delivering their project as expected (see Figure 7 below).

A key reflection by many beneficiaries was that timelines from grant notification to grant letter often lasted up to 9 months. This extended timeline, combined with not being able to back-date eligible payments or progress 'at-risk', was often cited by beneficiaries to have caused knock-on delays for project delivery and in some cases resulted in equipment cost inflation.

The delivery team and assessors agreed the process took longer than anticipated, as it involved several people from both DESNZ and external contractors. However, the delivery team and assessors reflected that it helped them to identify and mitigate potential risks and issues early on. Therefore, on balance, the approach to due diligence was seen as valid to ensure compliance with the Government Functional Standards for grants[30].

Most beneficiaries reflected that the information requested and format for due diligence was reasonable. However, some areas for improvement were indicated.

In Phase 1, applicants did not need to submit financial due diligence information prior to award notice, while in Phase 2, applicants were required to provide financial due diligence information within their application prior to award notice in order to streamline the process of due diligence within the Department. The views of one beneficiary demonstrate that frustration, stating:

> "[I] didn't understand why this information was needed before being successful. It should not be necessary to assess the project. This could be a barrier for some. They may not want to share this information at this stage". – Beneficiary, large organisation

Another beneficiary commented that some of the financial information requested prior to award notice had to be updated following award notice, creating a duplication of effort. The same beneficiary understood that rationale for speeding up the process, however the time to receive their grant offer letter was not seen to be reduced.

The financial template used within the application due diligence was also reported by one beneficiary not to be aligned to financial templates used in the contracting process and cost claims. Therefore, financial information previously provided could not be easily copied over but needed to be manually re-entered, adding to a wider sense of an inefficient and overburdening administrative process.

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[30] https://www.gov.uk/government/publications/grants-standards Government Functional Standard (GovS 015: Grants) promotes efficiency and effectiveness in grant making across all government departments and arm's length bodies.

Figure 7 IETF processes supporting project delivery

Q31. Thinking about the IETF processes, to what extent did the processes support you to deliver your project as expected

■ Supported ■ Neither supported nor did not support ■ Did not support ■ Did not experience process ■ Not sure

Process	Supported	Neither supported nor did not support	Did not support	Did not experience process	Not sure
Milestone Payment claims process / project milestone and compliance information [n=34]	68%	12%	12%	6%	3%
Quarterly progress reviews [n=34]	59%	15%	6%	15%	6%
Post application: DESNZ queries / application clarification question process [n=35]	57%	23%	11%	3%	6%
Project change request process [n=35]	46%	11%	6%	31%	6%
Site visits [n=35]	43%	23%	6%	23%	6%
Contracting processes [n=35]	31%	31%	14%	20%	3%

Percentage of respondents (%)

Source: Technopolis survey

Delivery

The majority of Phase 1 deployment and Phase 2 study and deployment grants are still live (as described below in the assessment of the Theory of Change). The majority of interviews with beneficiary projects of all types and phases reported that projects had either closed-out successfully or were progressing broadly as expected.

Where projects reported that they were not progressing as expected, this was either due to delays or cost increases which were caused by a range of factors, including delays as a result of contracting, supply chain factors, and site-specific factors (for example flooding at one plant delaying EE technology installation).

IETF delivery processes were generally reported to play a positive and enabling role in project delivery, while mitigating project failure/risks, as described below. A common theme reported by interviewed beneficiaries, however, was that delivery processes were often seen to be slow or requiring overly burdensome administration relative to grant size. The study findings on delivery team and processes are described below.

Stakeholders involved in programme delivery

Programme delivery was led by DESNZ with the support of external technical contractors. Following the receipt of a Grant Offer Letter and grant initiation, beneficiaries are designated a monitoring officer (MO) who is responsible for supporting and ensuring compliance with the grant terms and conditions, claims and auditing. An additional Technical Monitoring Officers (TMO) is responsible for supporting implementation of a benefits M&V plan. The MO functions are fulfilled by a combination of DESNZ personnel and external technical contractors, while the TMO functions were exclusively fulfilled by external contractors.

Applicants generally viewed DESNZ staff as providing high quality support for grant compliance and claims, and technical contractors were seen as helpful for developing and implementing M&V requirements.

The DESNZ delivery team agreed they had a strong relationship with the external contractors for Phases 1 and 2. The delivery team reported that external contractors provided high quality support for both technical and general monitoring officer support. It was highlighted, however, that the different roles and responsibilities between Technical MOs and the more generalist MOs was not always clearly defined, particularly where external contractors were also provided support for general MO functions.

Claims and auditing processes

DESNZ used various processes to monitoring projects funded in the programme. An assessment of these processes is described below.

Quarterly Progress Meetings

Quarterly Progress Meetings (QPMs) are the main monitoring touchpoints between MOs and beneficiaries to review and discuss project progress during the project implementation phase (until project completion). Quarterly progress reviews were widely regarded as useful, with **59%** (n = 35) of applicants stating they supported project delivery (see Figure 7 above). Beneficiaries valued the opportunity to track progress, identify risks early on, and engage with MOs for support around grant compliance, claims and report. The format of quarterly progress reviews was reported by beneficiaries to have improved in later phases, with an improved structure to make the review meetings more streamlined and effective in providing compliance guidance.

However, some beneficiaries found the fixed reporting schedule did not always align with internal business cycles or that their projects had not progressed meaningfully within the period, making reporting appear to some as more of a 'box-ticking' exercise than a meaningful review. One beneficiary also mentioned that as the program progressed, the focus of reviews shifted more towards compliance rather than dealing with the issues they encountered, limiting their usefulness. Beneficiaries also reported that at Quarterly Review Meetings, MOs were in "listening mode" and did not actively provide technical support to support project delivery.

Evidence from interviews with MOs suggested that resource constraints resulted in reviews that did not always provide sufficient insight into technical project risks. MOs were less able to identify challenges and budgetary risks to project delivery.

Claims payment process

Milestone payment claims were an important component of grant compliance monitoring, to assess and approve eligible spending. **68%** (n = 34) of applicants agreed that the process helped them progress, with beneficiary interviews generally reporting that the process was well structured. However, the need to provide proof of defrayal for each item of spend was seen by many beneficiaries as an unusual requirement compared to other similar grants (such as Innovate UK grants), which contributed to a sense of disproportionate administrative burden.

Beneficiaries are only allowed to claim for payments against the grant '*quarterly in arrears on a disbursement basis*' once defrayed.[31] In some cases, this contributed to cash flow challenges for smaller organizations who need to cover upfront costs for the accounting quarter. Linked to these cashflow challenges, contractors were sometimes unwilling to proceed without upfront payments, causing delays.

Internal resourcing constraints within the delivery team occasionally led to delays in processing claims, however, this was not found to be a major or consistent challenge. MOs also reported that occasionally they found it challenging to assess the eligibility of payment claims, due to a lack of detail on project costs within Grant Funding Agreements.

Project change requests

Where projects needed to amend their project plans, such as due to delays or cost changes, they were required to submit project change requests for review and approval by MOs. Project change requests were seen by the delivery team as an important tool for monitoring project risks, while allowing projects to adapt to evolving circumstances. **46%** of survey respondents (n = 35) believed process change requests supported project delivery, although experiences varied. Some found the process well-structured and straightforward, while others saw it as unnecessarily rigid, particularly for first-of-a-kind technologies.

A common critique of project change requests by beneficiaries was that they required extensive justification, requiring significant personnel time to develop revised project plans, with some beneficiaries feeling the process lacked the flexibility industry needs when responding to real-world challenges. Delivery team members acknowledged that their options for supporting struggling projects were limited beyond granting timeline extensions.

Site visits

Site visits were generally viewed as beneficial, as they offered an opportunity for direct engagement with MOs and a deeper project understanding. Beneficiaries found them valuable for improving communication and aligning expectations, particularly in relation to M&V.

While most experiences with site visits were positive, some beneficiaries had their site visits delayed due to administrative reasons. There were also several beneficiaries that did not receive site visits at all, meaning the benefits they provided were not experienced universally. Despite these inconsistencies, site visits remained an important tool for strengthening oversight.

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[31] https://assets.publishing.service.gov.uk/media/61dc81e78fa8f505953f4efa/ietf-phase-2-spring-2022-guidance.pdf

Monitoring & Verification process

IETF Monitoring & Verification (M&V) is a requirement of all deployment projects, to monitor the performance of installed technologies for 5 years following project completion. M&V activities generate the data needed to assess project and programme level benefits against the stated policy aims, with a primary focus on measuring reductions in emissions, energy consumption, and the cost of energy consumption.

M&V plans are developed during due diligence, through collaboration between MOs and beneficiaries, to develop bespoke benefits M&V plans for each project.

Figure 8 IETF M&V Process
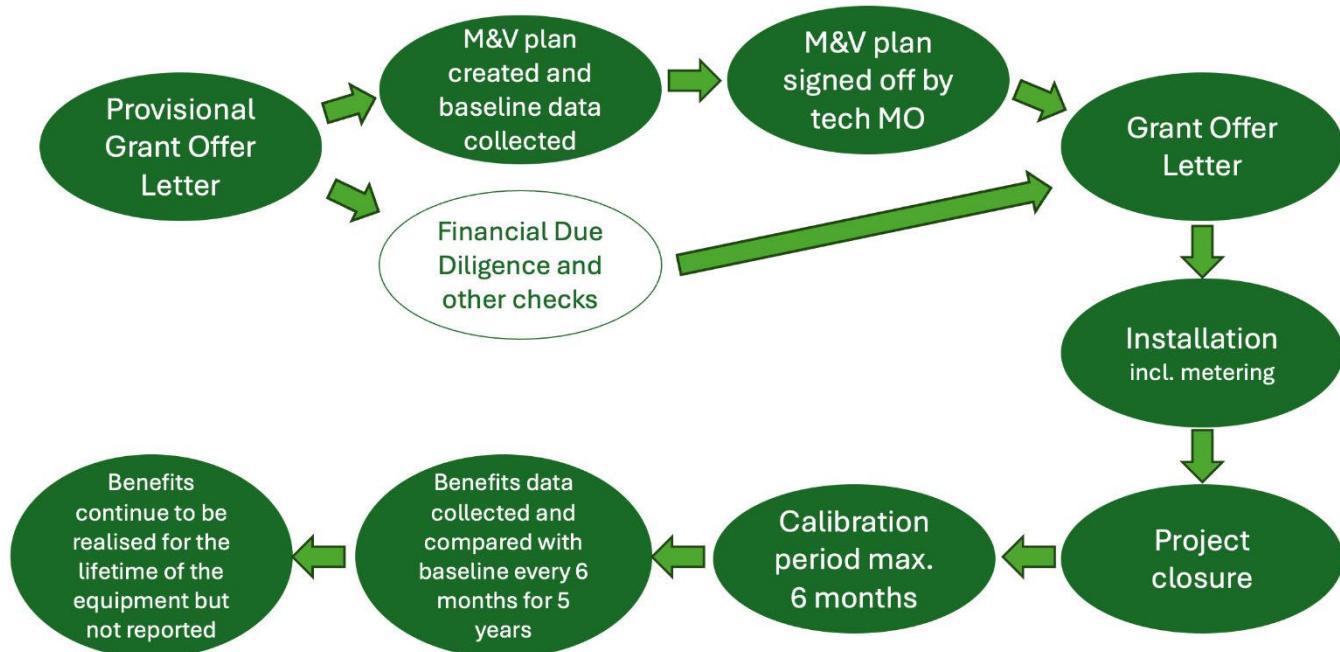
Source: DESNZ

Effectiveness of M&V in delivering objectives

The delivery team, TMOs and many beneficiaries considered the IETF M&V to be thorough and well designed to capture key information about emissions, energy consumption and energy costs. This suggests that these stakeholders think it is likely that M&V systems will be effective in accurately measuring programme benefits such as quantitative emissions reductions, energy performance improvements and value for money.

However, the delivery team reported that there are a small number of projects that have begun their live M&V tracking to date. Therefore, given the relatively early stage of M&V benefits monitoring, it is too early to assess the performance of M&V systems in capturing good quality and usable data required to demonstrate programme level benefits intended by the IETF (as also discussed in the chapter below on Theory of Change *outputs)*.

Users' experiences of M&V

It can be argued that M&V processes need to be proportionate to the value they create. As such, the study team has assessed the user experience of the M&V processes for usability and proportionality.

There were mixed views among beneficiary interviewees and survey respondents. Overall, the sense was that M&V process are useful for tracking project performance and are broadly proportionate to the scale of funding and complexity of projects. Beneficiaries view the support available from Technical MOs as good quality and were recognised by some smaller firms to be building the M&V capacity of firms by sharing advanced analytical techniques and tools, including statistical templates. It was recognised by some beneficiaries that DESNZ worked to support them in developing M&V plans tailored to their projects and information already being collected. Overall the M&V design and technical support were seen to have improved over different phases.

Over half of surveyed beneficiaries (**56%**) (n = 34) reported that benefits M&V processes provided a structured method for tracking energy usage and emissions reductions. For some beneficiaries who either did no prior M&V or limited M&V, the M&V process was seen to support better forecasting, resource planning, and performance tracking which would otherwise been done.

However, there were also frequently stated views that M&V requirements were burdensome, added little value to beneficiaries in terms of the management of their projects, and that DESNZ's M&V requirements led to a duplication of M&V which firms already do. Some beneficiaries also reflected that M&V requirements were disproportionate to the scale of their projects. This finding was somewhat at odds with the programme design for M&V plans, which intends for M&V plans to be tailored to the information and processes that beneficiaries were already using, to reduce burden on beneficiaries. However, it is not clear which specific elements of the M&V design were considered burdensome or challenging.

Size of organisation had a bearing on the perceived usefulness of M&V plans. Small and medium sized firms were more likely to see the IETF M&V requirement as adding value, while larger firms were more likely to see the M&V requirement as duplicative or additional to data they already collected and used. Whilst sample sizes are relatively low per organisation-size group, survey data shown in Figure 9 supports this assessment.

The study team note that there is a caveat to be taken into account for Figure 9, which is that respondents may have interpreted the question to refer to whether 'M&V activity had increased because implementing their IETF projects required monitoring and verification of an additional project/piece of equipment', as opposed to referring to 'IETF M&V being additional and more intensive than beneficiaries would have otherwise have implemented for the same piece of equipment without IETF funding'. However, based on interview evidence, the study team has interpreted that the survey respondents considered that the intensity of M&V for the same piece of equipment was higher as a result of meeting eligibility criteria related to receiving IETF funding.

Figure 9 Level of anticipated monitoring and verification activity in the absence of IETF funding, by project organisation size

Q40. How much additional monitoring and verification activity have you undertaken due to participation in IETF than you would have done if you had not received IETF funding? [n=34]
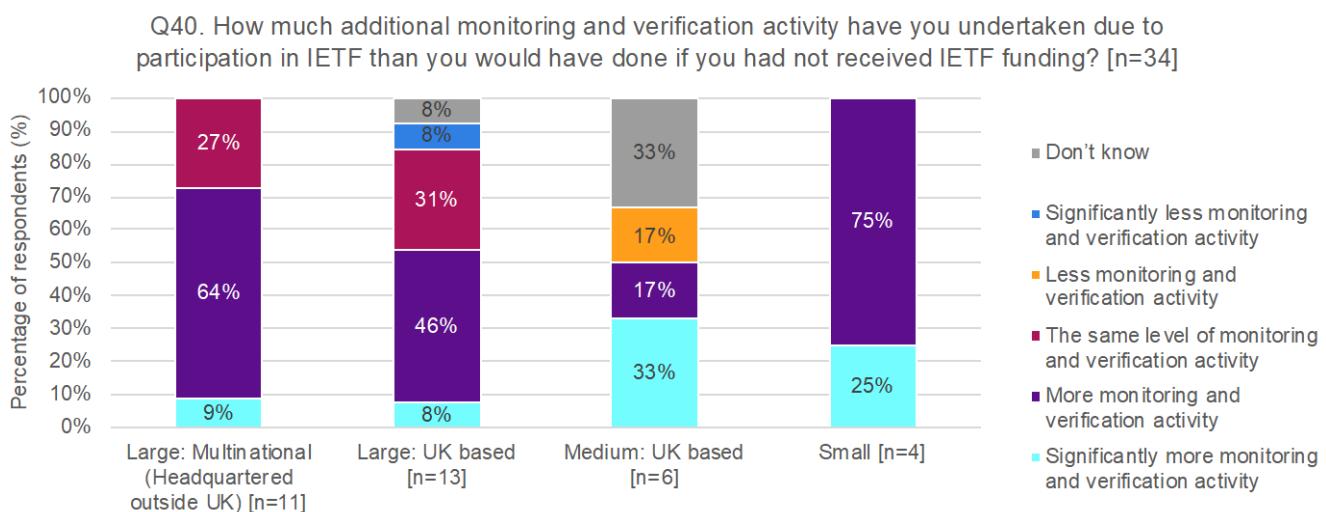
Source: Technopolis survey

Knowledge sharing

DESNZ undertook various knowledge sharing activities to support learning about EE and DD technologies among IETF beneficiaries and applicants, as well as dissemination of learning to wider industry.

To avoid duplication, findings and analysis on this theme are explored in the ToC chapters on DESNZ knowledge sharing activities, knowledge gained by projects, and spillovers to wider industry.

IETF and pathway to net zero

The IETF aims to provide significant subsidy support for the deployment of mature decarbonisation and energy efficiency technologies at scale. The IETF was specifically referenced in previous strategy documents[32] as a programme to support a net zero future.

The IETF complements a wider landscape of net zero policies. The IETF presents a synergy with the UK Emissions Trading Scheme (ETS)[33] objectives, as it offers a route for businesses to cut emissions ahead of the reduction of emissions allowances. Similarly, it complements the Hydrogen Production Business Model[34] and the Industrial Decarbonisation and Hydrogen Revenue Support (IDHRS) scheme, by providing support for capital investment in hydrogen

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[32] Powering Up Britain (2023)
https://assets.publishing.service.gov.uk/media/642468ff2fa8480013ec0f39/powering-up-britain-joint-overview.pdf
[33] https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets
[34] https://www.gov.uk/government/publications/hydrogen-production-business-model

infrastructure alongside long-term revenue support[35]. The IETF policy design also aims to support commercial demonstration and deployment of technologies supported by UK government innovation schemes such as the Industrial Energy Efficiency Accelerator, the Energy Entrepreneurs Fund (EEF), and the Transforming Foundation Industries Challenge (part of the Industrial Decarbonisation Challenge Fund).[36]

Stakeholders interviews highlighted that the IETF interacts with other environmental and economic policies which influence firms' investment decisions. As described above, these include the ETS which represents a medium to long-term financial pressure for companies, as well as mandatory efficiency requirements such as the Energy Savings Opportunity Scheme (ESOS) – which the IETF supports firms to align with and avoid financial cost.

Evidence from stakeholders suggested that they view the IETF as an important pillar of the UK's net zero strategy. It offers capital grants to help energy intensive industries decarbonise and improve energy efficiency, filling a funding gap for projects that might not qualify for other government support. Specifically, stakeholders pointed out that unlike other net zero programmes, the IETF supports relatively mature technologies, rather than focusing predominantly on innovation or energy generation.

The IETF is seen as providing an important incentive for multinational companies to invest group CAPEX in the decarbonisation of their UK subsidiaries, as opposed to other countries within their group structures. Stakeholders flagged that energy-intensive industries operate on low margins and face intense competition, and substantial government funding is crucial for funding decarbonisation projects that may not be in business-as-usual planning.

As highlighted previously, evidence suggests that IETF grants have enabled companies to undertake decarbonisation projects that would have otherwise not have been possible or have progressed at significantly slower timelines or smaller scale.

There are some factors that limit the effectiveness of the IETF in delivering large-scale change. Refinement of the application and delivery processes, as described elsewhere in this report, will also contribute to the scale impact of the IETF on decarbonising UK industries. Linked to this, ensuring a predictable and guaranteed funding period for the IETF was highlighted by beneficiaries and industry stakeholders as essential for businesses to commit to long-term decarbonisation plans. Longer-term grant funding models are therefore important to provide the certainty that UK companies need to make more strategic investment decisions and commit more resources.

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[35] https://assets.publishing.service.gov.uk/media/652eb3b56b6fbf000db75852/ccus-iccc-business-models-update-october-2023.pdf
[36] https://apply-for-innovation-funding.service.gov.uk/competition/842/overview#supporting-information

Unintended consequences

The study investigated unintended consequences of IETF. Overall, primary fieldwork did not uncover a large pool of evidence relating to unintended consequences.

The programme was launched post Covid-19, and firms were still dealing with high energy prices and inflation, accelerating the business case for decarbonisation. The invasion of Ukraine further impacted energy prices and the reliability of supply chains.

There was no clear evidence that these factors directly negatively affected applications, but there is evidence from beneficiaries that in a small number of cases, delayed award timelines and increasing costs did alter business cases for some applications, resulting in withdrawals.

However, these circumstances have also prompted the delivery team to integrate contingencies into the competition guidance. For example, they suggested companies to consider inflation calculations (**~10%-15%**) in their submissions.

Assessment of progress against Theory of Change

Summary Findings

The evidence presented below finds that the Theory of Change (Figure 10, below) **(from Inputs to early Outputs) broadly holds, and no clear changes are required.**

ToC Inputs:

- Capital, resources, time from applicants, expertise from DESNZ, and third-party contractors have been made available as inputs to the IETF.

ToC Activities:

- Capital, resources, time and expertise from applicants, DESNZ, and third-party contractors has been used to create high-quality project applications.

- The IETF has allocated grant funding to 'good quality' projects across the portfolio – based on the views of the DESNZ delivery team and assessors, and via the application of a rigorous assessment process.

- The DESNZ team made efforts to signpost applicants to other relevant sources of funding.

Overcoming financial barriers:

- Leveraged matched funding and successful project delivery provide early signs that financial barriers have been overcome.

- IETF supported studies are helping firms to make informed decisions about deployment of EE and DD technologies.

- EE projects have been delivered, with IETF funding derisking projects for investors. There is emerging evidence that these projects are operational and showing signs of positive carbon and financial outcomes.

- Decarbonisation (formerly Deep Decarbonisation) projects have been delivered, with IETF grants de-risking and incentivising early adoption of decarbonisation technologies.

Overcoming capability barriers:

- Evidence suggests that IETF grants are enabling some capability barriers to be overcome predominantly around DD but also EE technologies, and the IETF has provided some opportunities for knowledge sharing and dissemination.

- Learning has primarily occurred through the personnel time and access to technologies which IETF grants have funded. IETF grants have also supported learning and upskilling by providing access to external expertise in the form of consultants, technology providers and academic partners.

- Evidence suggests that knowledge sharing has predominantly been internal within firms, but there are also some spillovers to wider industry primarily through project supply chains and consortium partners. However, many projects are still at an early stage, therefore wider knowledge spillovers may yet occur but over a longer time span.

- There is evidence that DESNZ has facilitated knowledge sharing events between industry participants and industrial clusters, primarily through technology showcase events. Beneficiaries reported these as having some benefit for promoting the IETF to new applicants and providing project ideas. The impact of these events within wider industry is less clear at this stage.

Outputs:

- There is evidence that some IETF funded EE and DD deployment projects are now operational as expected, and good indications that the majority of active projects are progressing towards operation as expected.

- There is strong evidence that IETF grants have supported the completion of high-quality studies.

Theory of Change Assessment

Figure 10 below shows the extract of the IETF Theory of Change (ToC) Diagram that is within scope of the Final Process Evaluation. The extract of the diagram includes the following elements:

- Inputs (Boxes 1-4, grey)

- Activities (Boxes 5-11, blue)

- Barrier to be overcome (Boxes 12-15, orange)

- Outputs (Boxes 16-19, green)

The arrows that link boxes in the ToC diagram represent the causal pathways that demonstrate how one element (i.e. box) of the ToC links to another. The colour of the arrow (green, orange, red) indicates the strength of confidence about the causal mechanism prior to the start of the evaluation (higher to lower certainty, respectively). The ToC assessment aims to answer the following research questions:

ToC RQ #1: To what extent, based on evidence available to date, should one have **confidence in the causal story as detailed in the Theory of Change (steps 1-19)?**

ToC RQ #2: What **aspects of the Theory of Change**, if any, require changing and what are these changes?

Figure 10 IETF Theory of Change (within scope for evaluation)
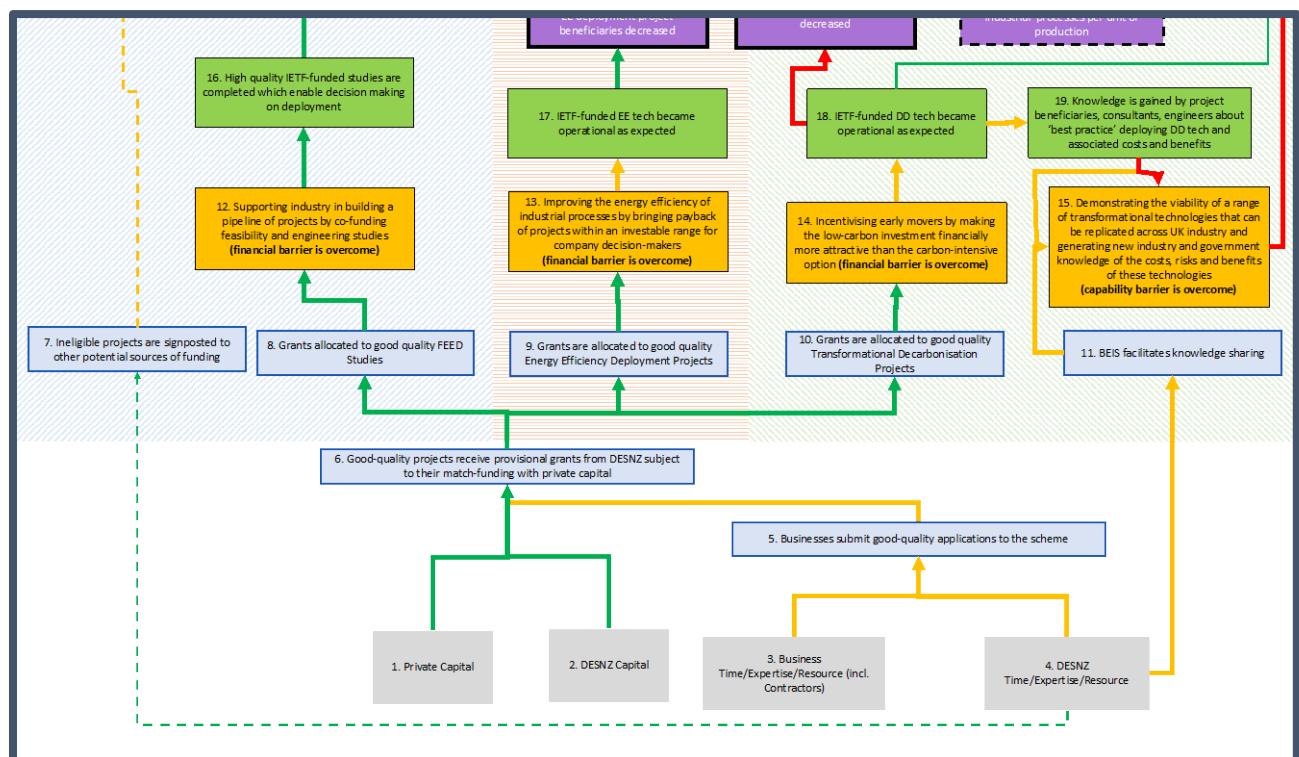
Source: DESNZ

This study aims to gather and assess evidence on the progress and accuracy of the Theory of Change that is presented above in Figure 10. The remainder of the chapter will assess the evidence available to test each of the groups of Theory of Change elements (inputs, activities, etc.). We will also assess the causal pathways that provide the linkages from one element to the next.

The chapter is structured to echo the path through the ToC. Each section starts a cross-section of the ToC Diagram showing the relevant ToC elements (inputs, activities, etc.), followed by narrative discussion and evidence supporting the existing ToC, or where there is evidence to suggest an amendment to the ToC is needed.

Inputs

The inputs to the IETF Theory of Change are shown below in Figure 11.

Figure 11 IETF ToC Inputs (Box 1-4)
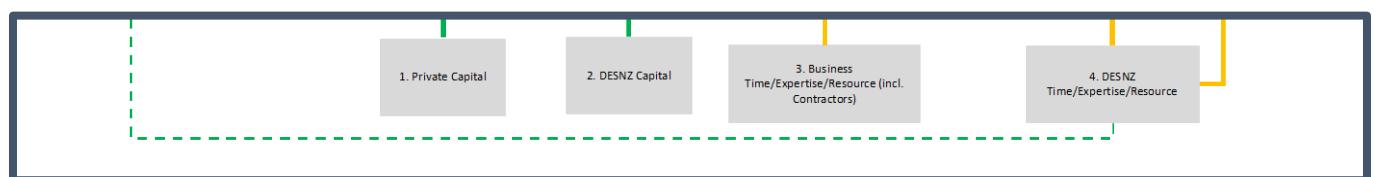
Private capital and DESNZ capital (Box 1, Box 2)

Table 2 shows the total allocated funding and the total grant funding awarded per phase.

Table 2 IETF allocated funding, awarded funding and leveraged private capital (Phase 1 and Phase 2)

Phase	Allocated Funding	Awarded Funding	Percentage awarded vs funding allocated	Total leveraged private capital (estimated)
Phase 1	£70m	£42.5m	60.7%	£87.0m
Phase 2	£260m	£131.6m	50.6%	£323.6m
Overall	£330m	£174.1m	52.8%	£410.6m

Source: Technopolis using DESNZ IETF delivery database (Aug 2024 snapshot)

Phase 1 and Phase 2 awarded funding totalled around £174.1 million which represents a significant pool of funding to support industrial decarbonisation. However, the table shows that for both phases, total grant funding was approximately **53%** of the allocated funding for the scheme. Assessors cited the quality of applications as a primary reason for the low allocation of funding. Assessors typically supported the view that there was a broadly even distribution of good and low quality applications, though some assessors reflected that where applications were unsuccessful, they tended to be very poor quality. As described in the section on

Assessment, Due Diligence and Award (page 35-38), the final percentage of applications that were awarded grants indicates that the assessment process was rigorously applied to a cohort of mixed quality applications, helping shape a final portfolio of projects deemed good quality by the DESNZ delivery team and assessors.

Where projects were withdrawn after the grant offer letter was issued to the project team (i.e. the project was successful during the assessment[37]), a variety of reasons were provided in Withdrawal Forms[38] for withdrawal. These reasons included: project lead assessment of insufficient technological readiness of the proposed solution, dependence on third party contractors that were no longer available to support, and in one case, the project team would not ultimately agree to the grant conditions set out in the guidance.

As shown in Table 3 above, an estimated £410m of private funding will be leveraged by Phase 1 and Phase 2 of the programme, representing a ratio of approx. £2.36 private capital leveraged for every £1 of public money invested at the project level. This has been achieved through the strict grant-to-private funding ratios set out in the application guidance[39]. Leveraging private finance ensured that project teams brought forward their own financial resources to deliver the projects. However, it should be noted that owing to fewer than expected applications, total leveraged funding fell below expectations as set out in programme business cases.

Business and DESNZ time, expertise and resources (Box 3, Box 4)

For applicants, short timelines required for application preparation posed a challenge, leading many applicants to rely on external consultants. Figure 12 below shows that **59%** of survey respondents used consultants, and more than half of those considered them extremely useful or very useful.

Figure 12 Usefulness of consultant in supporting IETF application development
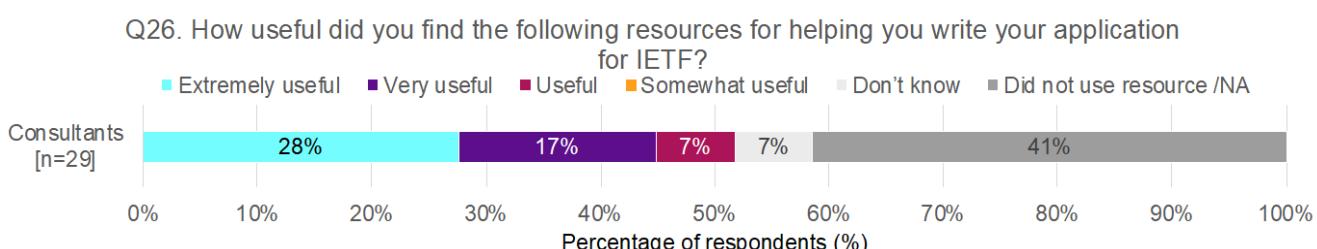
Source: Technopolis survey

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[37] As opposed to projects which withdrew prior to being issued with a grant offer letter. These projects cannot categorically be classed as successful at the assessment stage, although that may have been the case
[38] These are forms submitted to DESNZ by project teams at the point at which a project decides to withdraw from the programme.
[39] Maximum grant subsidy intensity Large (L) / Medium (M) / Small (S) company: Feasibility study: 50% (L), 60% (M), 70% (S). Engineering study: 25% (L) 35% (M) 45% (S). Energy efficiency deployment: 30% (L) 40% (M) 50% (S). Decarbonisation Deployment: 50% (L) 60% (M) 70% (S). Energy efficiency and decarbonisation deployment grants are also eligible for subsidy intensity uplift for location assisted area, at 15% for area A and 5% for area C. Source: https://assets.publishing.service.gov.uk/media/66b4b94049b9c0597fdb0cce/ietf-phase-2-autumn-applicant-guidance.pdf

In many cases, beneficiaries stated that consultants provided much needed resource capacity, allowing project teams to deliver bids whilst also focusing on their business as usual. Consultants offered skills in engineering knowledge, as well as project management and project delivery. A core aspect of their appeal was that they also carried with them prior experience with IETF and similar grant applications. Effectively, as the programme was delivered through multiple round/ phases, hiring consultants became the 'how to' in order to secure funding.

DESNZ invested resources improving the scheme between phases and ensuring the application process did not alienate companies that could not hire external consultants (specifically SMEs in Phase 2). For example, increasing engagement and support for applicants during the pre-application stage, including answering questions and queries through the IETF email inbox, and iterating the contents of the competition guidance.

DESNZ utilised external expertise, with ICF[40] providing technical due diligence and Technical MO expertise during Phase 1 and 2. Whilst the delivery team indicated that lack of clarity between the remit of Technical MOs and compliance focused MOs may have caused inefficiencies, clearer boundaries and streamlined processes have enhanced project monitoring and delivery in later phases.

Activities

The activities delivered by the programme as set out in the IETF Theory of Change are shown below in Figure 13.

Figure 13 IETF ToC Activities (Box 5-11)
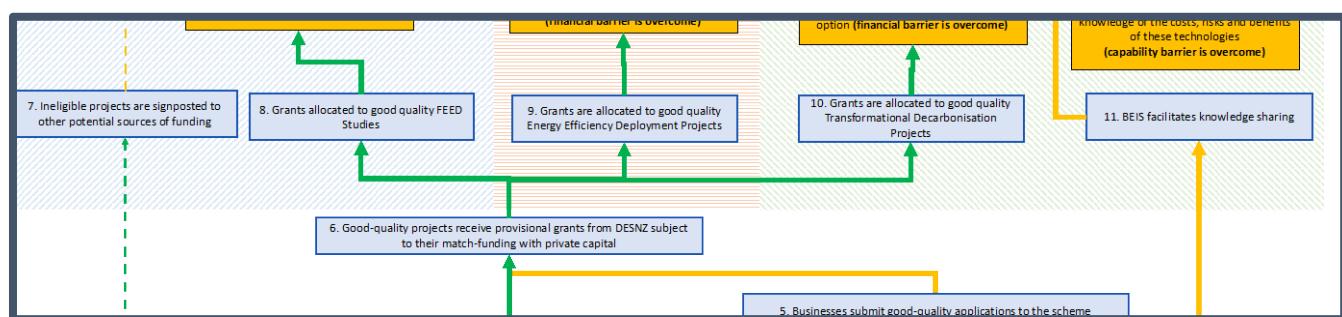
Businesses submit good quality applications to the scheme (Box 5) and grants allocated to good quality projects (Box 6/8/9/10)

Based on August 2024 programme data[41], there had been 145 successful applications from 494 separate applications, demonstrating an award rate of **29.3%** in terms of projects awarded.

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[40] https://www.icf.com/
[41] DESNZ IETF delivery database (Aug 2024 snapshot)

From this, grants totalling £213m had been allocated to successful projects representing a grant award rate of **31.2%** of total funding requested.

The award rate suggests that, whilst there were clearly a good number of high quality applications, there is strong evidence to suggest that there was significant variance in the quality of applications. Assessors supported this view and were vocal in their descriptions of the wide range in quality of the applications, with one assessor estimating that around only **60%** of applications they reviewed were of good quality. Several assessors flagged that the application was onerous and complex but justified in this approach given the large grant sizes available.

Evidence from assessors also identified trends among applicants that demonstrated differences between smaller and larger organisations submitting applications to the IETF. Assessors identified that applications from smaller organisations typically suffered from being rushed or developed to a low standard. Whilst larger companies (often able to hire consultants to assist them) typically were able to deliver proposals that demonstrated competence and provided sufficient levels of detail required to score highly on the assessment criteria.

Overall, the IETF has been effective in allocating grants to studies (n = 58), EE deployment projects (n = 61), and DD deployment projects (n = 26), which is reflected in the number of eligible projects selected, and the good levels of progress observed to date in these projects.

Ineligible projects are sign posted (Box 7)

Evidence from assessors suggested that applicants were directed to relevant alternative funds through applicant guidance documents, email support, and advisory services, particularly in the earlier phases when more alternative programmes were available. For example, the guidance for Phase 1 (Spring)[42] provided text to identify alternative sources of funding. During Phase 2, the IETF Phase 2 policy statement[43] directed applicants to alternative sources of funding through the Industrial Net Zero Funding Service[44]. Between April 2021 and October 2022, this site added links to twelve separate government schemes where '*Funding opportunities will be awarded to businesses investing in green technologies to increase energy efficiency or reduce carbon emissions*'.

However, assessors reported that they were typically not aware of ineligible or unsuccessful projects being signposted to alternative sources of funding directly as part of the assessment notification process.

In some cases, applicants revised and reapplied successfully in subsequent IETF funding rounds. Analysis of the Phase 1 and Phase 2 applications database showed that were 13 cases of applicants being unsuccessful in their first application and securing funding in later rounds. Regardless of whether the applications related to the same proposed projects, this suggests that there was some degree of learning-by-doing present in the process.

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[42] https://apply-for-innovation-funding.service.gov.uk/competition/842/overview#supporting-information
[43] https://www.gov.uk/government/publications/industrial-energy-transformation-fund-ietf-phase-2-policy-statement
[44] https://www.gov.uk/guidance/find-funding-to-help-your-business-become-greener

DESNZ facilitates knowledge sharing (Box 11)

DESNZ undertook activities to facilitate and promote knowledge sharing. The IETF team delivered webinars[45] and technology showcase events for a range of stakeholders.

Table 3 provides aggregated attendance data for the showcase events[46]. Typically, stakeholders who attended these events included: government, academia, IETF beneficiaries, research and technology organisations (RTOs), trade associations and others.

Table 3 Attendance at IETF showcase event Nov 2021 to Mar 2024

Showcase event	Date	Attendees[47]
1	10-Nov-21	151
2	10-Mar-22	104
3	14-Jul-22	243
4	17-Nov-22	172
5	16-Nov-23	180
6	15-May-23	795
7	21-Mar-24	224
	Total (7 events)	**1869**

Source: DESNZ market engagement data

Whilst the attendee numbers demonstrate that the IETF team put significant effort into setting up spaces to facilitate knowledge sharing, survey data is more muted on the extent to which beneficiaries attended. Beneficiary survey data showed that only **50%** (n = 30) of beneficiaries participated in an IETF knowledge sharing event, with 8 (**26%**, n = 30) stating that they specifically attended showcase events.

Besides facilitating knowledge sharing events, DESNZ also require applicants to explain their dissemination plans to encourage wider industry learning. Project dissemination activities typically include publishing case studies and presenting funded projects at industry events. Projects generally reported that at this stage they had not engaged in dissemination activities beyond participation in DESNZ facilitated events. One account from a beneficiary who had developed a case study report on a hydrogen furnace technology as part of their dissemination plan, described how the report had become a useful communication asset for the firm, and was circulated by their industry association.

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[45] https://iuk-business-connect.org.uk/events/technology-showcase-industrial-energy-transformation-fund-phase-2/
[46] The higher attendance figure for the showcase event on 15th May 2023 was due the event being held online.
[47] This includes some duplication across events.

Causal Pathways – Inputs to Activities

This section provides evidence demonstrating how and why the causal pathways between inputs and activities (shown in Figure 14 below) have occurred.

Figure 14 Causal pathways linking inputs to activities
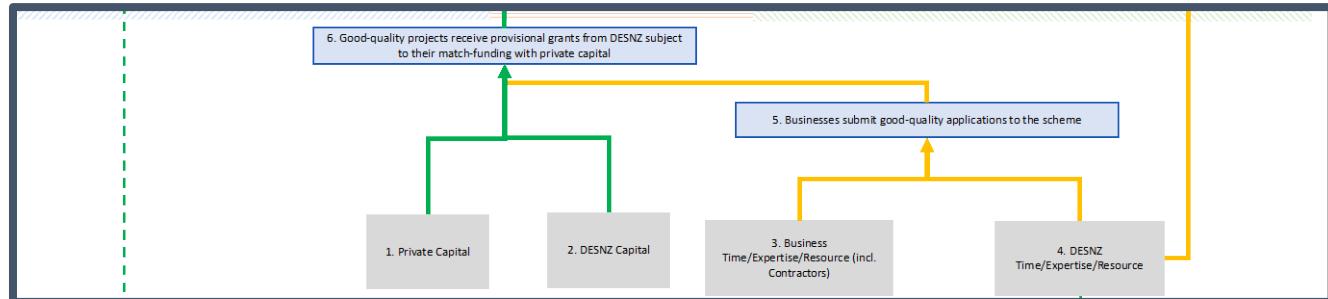
Causal Pathway for ToC Supplement indicator #11

The TOC Supplement Indicator #11 causal narrative is:

DESNZ's time, expertise and resources **(Box 4)** leads to *DESNZ facilitates knowledge sharing* **(Box 11)** because the *IETF delivery team organise knowledge-sharing events with industry stakeholders outside of project beneficiaries and publish case studies of successful projects* which are accessed by industry stakeholders.

As set out in the section above, DESNZ allocated resources to supporting projects in showcasing their project outputs. Beneficiaries did not identify additional activities that DESNZ had undertaken to encourage additional knowledge sharing, with most of the knowledge sharing and spillovers occurring via other means such as through projects' interactions with their supply chains and industry associations.

Causal Pathway for ToC Supplement indicator #5

The TOC Supplement Indicator #5 causal narrative is:

Business and DESNZ's time, expertise and resources **(Box 3 and Box 4)** leads to *businesses submitting good quality applications to the scheme* **(Box 5)** because businesses have sufficiently experienced and knowledgeable staff and/or contractors to prepare good-quality applications and the pre-application and application process is designed effectively by DESNZ so that business awareness of the scheme is high, application windows are sufficiently long, application requirements are clear and adequate guidance and support is provided to applicants.

As discussed in the earlier chapter on *Application Process* (page 31), DESNZ delivered a suite of support mechanisms to aid businesses in submitting good quality responses. Survey data shown in Figure 15 below reveals that successful applicants recognised the support that the written application guidance provided to them (**66%** of surveyed applicants stated that it

supported them in submitting an application). Around half of successful applicants also cited written queries (**52%**) and applicant workshops (**48%**) as useful mechanisms that supported their submission.

Figure 15 Processes that supported applicants to submit an application
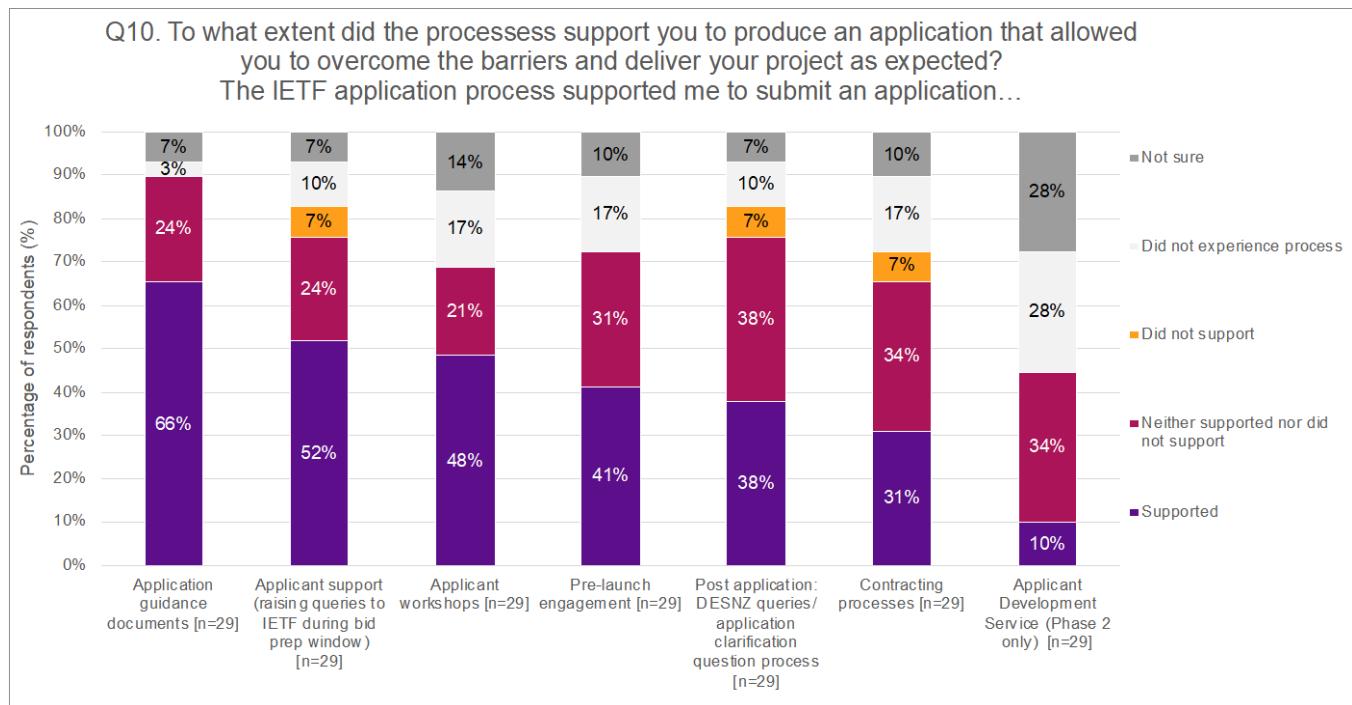
Source: Technopolis survey

Stakeholder interviews with beneficiaries broadly supported the findings from the survey. Several beneficiaries highlighted that the guidance documents were their main reference point when preparing their application, describing them as *'clear'*, *'useful'*, and that it was the *'main thing they relied on'*. However, there was also a sense that the email clarification service was important to support applicants in understanding how to deal with implementing their proposed project within their specific context.

Whilst not all applicants attended briefing events, several who did attend noted that they were *'helpful'* but often not considered sufficient in isolation. Applicants described that the practice of asking previously successful projects to present was useful to understand the issues that they had already encountered. Reflecting further on this, one applicant stated that *'…it helped us become aware of other issues that we hadn't thought of'*.

Larger organisations have more resources than smaller organisations, and the evidence suggests that larger organisations were able to leverage these resources to develop higher quality bids. As mentioned earlier, larger businesses typically improved their applications by using external expertise, such as consultants and contractors, supporting the development of more technically sound, better evidenced and well-structured proposals.

Smaller businesses faced challenges in submitting quality applications due to limited resources, but evidence suggests that they were able to use DESNZ's proactive support

measures, such as clear documentation and accessible communication channels to partially helped them overcome these obstacles. However, delivery team and assessment stakeholders still noted that smaller applicants were not always able to fully overcome their resource challenges with the quality of bids suffering in several cases. One applicant suggested that workshops/ briefing events could be targeted for the size of the organisation. This could include events specifically for SMEs.

Causal Pathway for ToC Supplement indicator #6

> The TOC Supplement Indicator #6 causal narrative is:
>
> *[Private capital]* **(Box 1)** with *[DESNZ capital]* **(Box 2)** and *[Businesses submit good quality applications to the scheme]* **(Box 5)**, causes *[good-quality projects receive provisional grants from DESNZ subject to match-funding]* **(Box 6)** because there is sufficient grant funding available from the IETF pot to invest in projects and the scheme is effective in leveraging private capital or finance from businesses in line with the scheme's eligibility requirements and the scheme's assessment process is well-designed to ensure that only good-quality projects receive provisional grants.

The assessment process is the mechanism by which DESNZ capital was allocated to good-quality IETF projects. As part of their applications, applicants identified the level of DESNZ capital that was required to support their organisation's business case for implementation. The strict matched funding thresholds resulted in leveraging of private matched funding.

Applications were scored against a range of criteria by technical and commercial assessors to develop a consolidated score for each application, which were then balanced with a moderation panel review ensuring grants were directed to a portfolio of high-quality projects.

Front end engineering design (FEED or 'engineering') studies assessments typically took less time than deployment projects, reflecting the reduced complexity of the proposed projects. Deployment projects required more rigorous evaluation to balance technical feasibility risks, strategic alignment, and long-term environmental benefits.

As described in the earlier chapter on Assessment, delivery teams and assessors noted that moderation typically worked well and supported the development of a balanced portfolio of successful projects during each round. They also highlighted that the award criteria required moderation to ensure a balanced portfolio of diverse DD and EE projects, and for different industries and sized companies. For example, some DD projects are more energy intensive but achieve a net carbon reduction, and there is a natural bias towards larger companies which achieve greater economies of scale for energy efficiency and decarbonisation performance. One assessor highlighted that scrutiny calls were particularly helpful for requesting additional information or clarity on some aspect of the application.

These stakeholders also identified that there were a very small number of cases where decision making was escalated, and wider government stakeholders (programme directors, ministers) were consulted to make informed decisions around project award.

Overall, however, assessors had to balance the quality of the awarded portfolio of projects with the level of subscription, as one assessor summarised:

> *"At the end of the day, the IETF was undersubscribed and the meetings with the moderation panel were an opportunity to try and be fair to applications and get as many projects funded as possible (that were deliverable)" – Assessor*

As discussed in the earlier chapter on Attractiveness and Design, results from the survey also provided a positive picture when considering the decision to split the programme into separate Energy Efficiency and Decarbonisation (formerly Deep Decarbonisation) strands to focus on specific financial and capability barriers present for each group.

60% of survey respondents (n=30) thought that the split encouraged them to apply, **57%** stated that it encouraged them to focus on the deliverability of the project, whilst only **44%** agreed (and **17%** disagreed) that they needed to adjust their projects to meet the scope of the strand, implying that the separation of the programme accrued deliverability benefits without significantly burdening applicants.

Overcoming Barriers and Outputs

The IETF programme set out to support beneficiaries in overcoming both financial and capacity barriers. By overcoming these barriers, the programme activities were intended to lead to programme outputs. These are set out in the IETF Theory of Change below in Figure 16. This section provides evidence to explore whether barriers have been overcome and whether overcoming barriers has resulted in achieving programme outputs.

Figure 16 IETF ToC Overcoming Barriers (Box 12-15) and Outputs (Boxes 16-19)
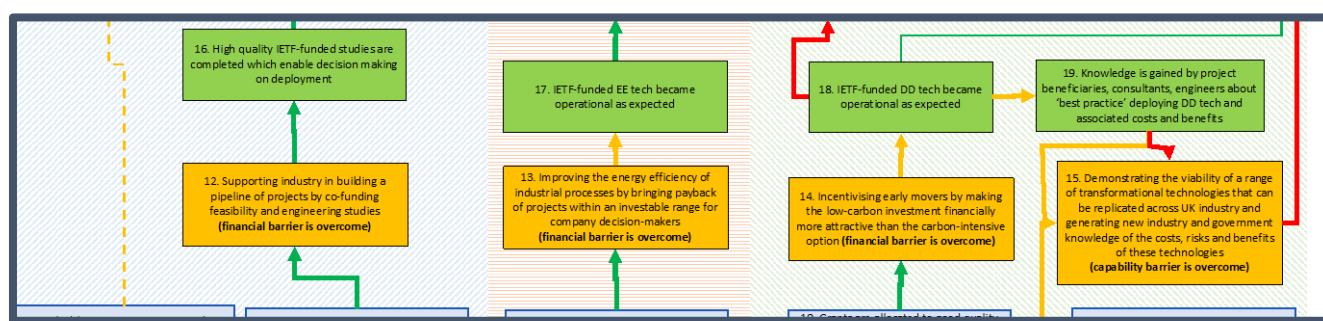
## Financial Barrier is overcome (Box 12/13/14), studies have enabled decisions on deployment (Box 16)

Figure 17 (a) below shows the value of grants allocated to the three types of IETF project[48], per phase. In terms of producing a pipeline of studies (Box 15), IETF has funded 58 feasibility studies with over £8m and 14 engineering studies with over £12m.

---

[48] Feasibility studies, engineering studies, and deployment projects

As discussed in the earlier chapter on [Attractiveness](#), grants were consistently reported by beneficiaries as essential to enable exploratory studies, by derisking and incentivising matched internal investment. This suggests that studies have been effective in supporting firms to overcome financial barriers. Beneficiaries consistently reported that studies helped firms to better understand technologies and costs, with many progressing to further feasibility and development stages, as well as developing business strategies based on the opportunities identified in studies. Whilst this gives some evidence that the grants were required, and financial barriers to development have been overcome, there is a strong incentive for grant recipients to provide this viewpoint, and therefore the study team notes the self-reporting bias that may have been present in this stakeholder group. Interviews with dropouts suggested they submitted multiple project applications and pursued the successful applications with the most positive business cases. This supports the idea that funding supported marginal cases for investment.

Figure 17 IETF grants, a) engineering studies and feasibility studies, by grant type and phase; b) all deployment projects, by EE/ DD specialisation and phase.
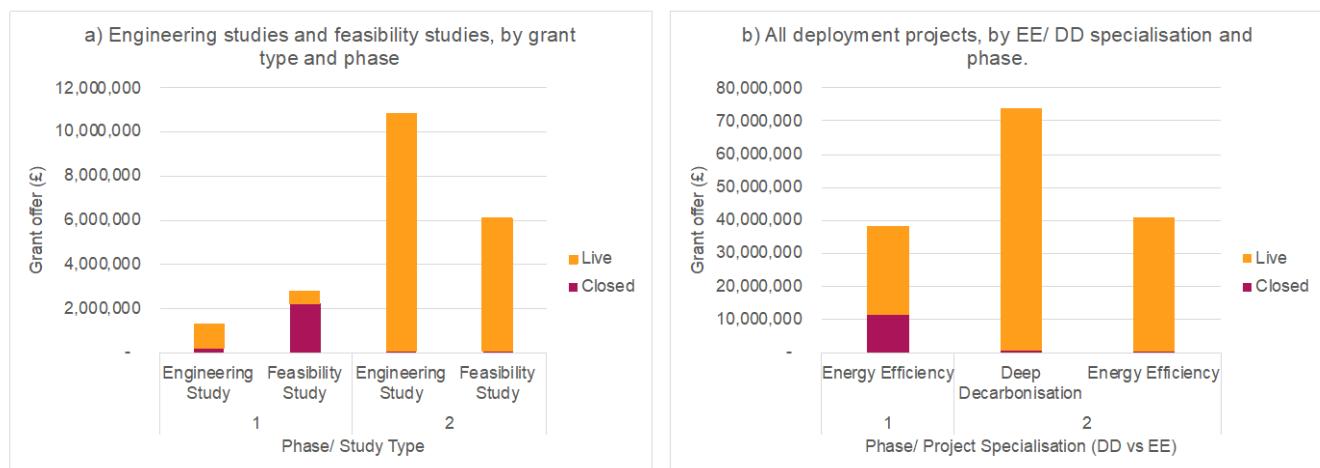
Source: Technopolis using DESNZ IETF delivery database (Aug 2024 snapshot)

IETF deployment projects are operational (Box 17/18)

Figure 17 (b) shows that over £153m has been provided to beneficiaries to date as part of their deployment project grants during Phase 1 and Phase 2.

Looking towards longer term operation of the assets deployed with IETF support, projects are typically only in the first years of operation or not yet operational.

Where projects have experienced delays in delivering deployment projects, these have typically been as a result of a range of engineering and supply chain factors. Long grant contracting timelines have contributed to delays and in some cases led beneficiaries to miss planned annual maintenance shutdowns or caused delays due to suppliers not being available for the new project timelines. This has slowed the start of the asset operation period.

Further evidence to support the delivery of this output is provided in the assessment of the financial barrier causal pathways below.

Knowledge is gained about decarbonisation deployment (19) and capability barrier is overcome (15)

While the ToC focuses on overcoming capability barriers specifically for DD deployment, there is clear evidence that the IETF has contributed to overcoming capability barriers through all strands of the programme, though capability development was more significant among DD projects and DD studies in particular.

Interviews with beneficiaries developing decarbonisation projects revealed that they were almost unanimously able to identify learnings from their projects. Learnings typically related to better understanding of available technologies and the technical feasibility and applicability of low carbon energy sources for use in industrial processes. This included a better understanding of engineering, costs, risks and regulations.

Energy efficiency deployment beneficiaries, meanwhile, were more mixed in their views of whether they have gained knowledge and learning from project delivery. These projects stated that where learnings had occurred, they were less technical, and more related to understanding of costs and refinement of existing capabilities.

Projects that involved installation off-the-shelf equipment upgrades or relatively simple fuel changes (e.g. diesel to electric motors) reported lower levels of upskilling due to less complex engineering.

Where upskilling has occurred, beneficiaries identified IETF grant funding as pivotal to resourcing personnel time, purchases of equipment, and collaboration with external experts including consultants and academic partners.

However, many beneficiary project teams reported that limited upskilling had occurred, which they viewed as unsurprising given the IETF application criteria requiring TRLs of 7 and above, and the *deliverability* application assessment criteria requiring project teams to possess all required capabilities for the project. This was also confirmed by one member of the delivery team, who stated:

> *It wasn't part of the proposal- it was the opposite. Part of the technical assessment was already having the capability within the company, this was a huge part of the assessment criteria. They were looking for projects that had the breadth of experience to deliver the project. – Delivery team stakeholder*

Some beneficiaries from foundation industries (such as chemicals, paper, glass and metals industries) also highlighted the risk averse nature of their industries and reticence to implement technologies at scale with which they didnot have familiarity.

The delivery team echoed that upskilling was not a primary focus of the IETF but highlighted a nuance that the IETF aims to support the development of knowledge and capabilities within a limited threshold (i.e. reflecting TRL levels). The delivery team also reflected that knowledge and capability development is built into the IETF programme structure, as it enables companies to first apply for study grants before progressing to deployment. Assessors also

highlighted that applications which followed this route were generally much stronger due to being able to demonstrate a wider evidence base.

Causal Pathways – Activities to Overcoming Barriers - financial barriers

This section provides evidence to demonstrate how and why the causal pathways between activities and overcoming financial barriers (shown in Figure 18 below) have occurred.

Figure 18 Causal Pathway – overcoming financial barriers
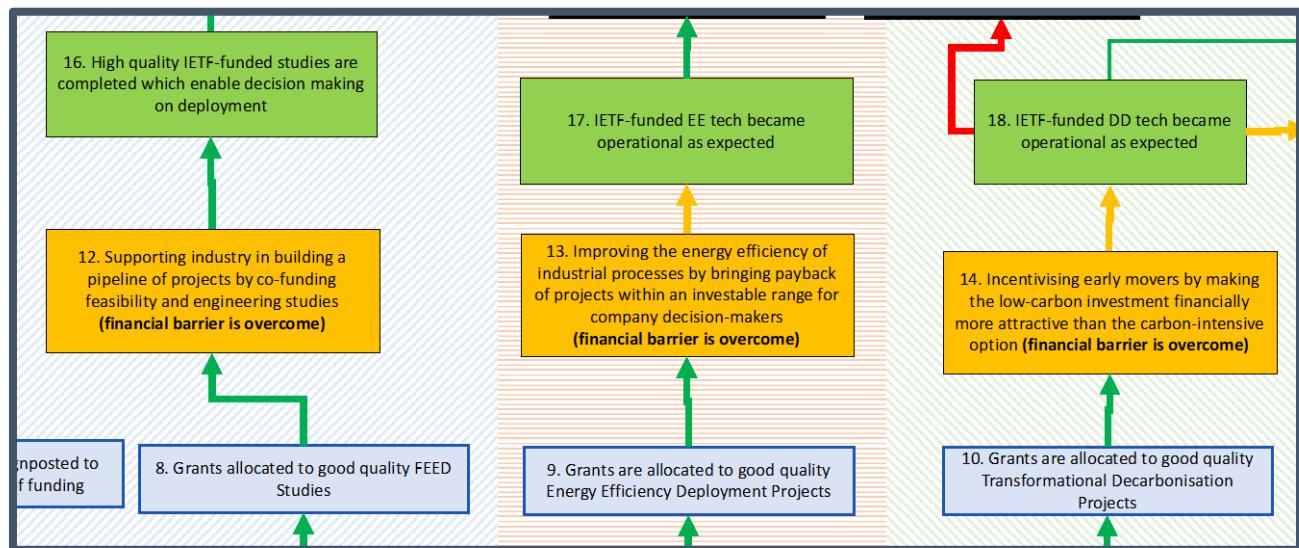
Causal Pathway for ToC Supplement indicator #12 and indicator #16

The TOC Supplement Indicator #12 causal narrative is:

Grants are allocated to good quality feasibility studies **(Box 8)** causes the *risk of financial loss is abated if the study shows the project is unfeasible (financial barrier is overcome)* **(Box 12)** *because successful FEED/feasibility studies are delivered as planned.*

The TOC Supplement Indicator #16 causal narrative is:

The risk of financial loss is abated if the study shows the project is unfeasible (financial barrier is overcome) **(Box 12)** causes *high-quality IETF-funded studies are completed, which enable decision-making on deployment* **(Box 16)** because *the risk of financial loss for a business if a FEED/feasibility study shows a deployment project is unfeasible is abated.*

A delivery team stakeholder stated that there were some instances of companies conducting a study in earlier phases of IETF and then doing deployment projects in one of the later windows. As may be expected, delivery team interviews highlighted that applications that had

referenced a previous IETF funded feasibility study were often stronger applications. Analysis of the live grants database corroborates this view - there are a small number (estimated to be less than 5) of closed feasibility and engineering studies that have led directly to organisations securing Phase 1 and Phase 2 IETF grants to develop further engineering studies or undertake deployment. This provides some weak, but positive evidence that feasibility and engineering design studies are able to build a pipeline of projects in the sector.

When asked to consider the role of studies, project beneficiaries reflected that studies played a supportive role in identifying the viability of future projects, suggesting that the IETF feasibility strand was creating a pipeline of projects that would be funded in the future. The causal link between IETF feasibility / engineering studies in developing a wider pipeline of projects was articulated clearly by several project beneficiaries during interviews:

> *"…it helped assess the financial risk of progressing to the next stage of feasibility study or deployment. Some projects found they were feasible, some not feasible, or some borderline feasible... without high quality feasibility studies, industry is even less likely to move towards deployment." – Project beneficiary*

Causal Pathway for ToC Supplement indicator #13 and indicator #17

> The TOC Supplement Indicator #13 causal narrative is:
>
> *Grants are allocated to good quality Energy Efficiency Deployment Projects* **(Box 9)** causes the *payback period of EE projects are reduced to an acceptable level (financial barrier is overcome)* **(Box 13)** because *successful EE deployment projects are delivered as planned.*
>
> The TOC Supplement Indicator #17 causal narrative is:
>
> *The payback periods of EE projects are reduced to an acceptable level (financial barrier is overcome)* **(Box 13)** causes *IETF-funded EE tech were installed and became operational as expected* **(Box 17)** because the payback period for EE projects is improved and becomes financially viable for businesses.

Beneficiaries consistently reported that IETF grants made EE and DD investments viable, by derisking projects and bringing the payback period within a viable range. As such, these grants appear effective in supporting firms to overcome financial barriers to deployment.

The evidence available to the study team to appropriately support the causal claim (that EE technology becomes operational) was relatively weak due to the early stage of deployment project delivery. However, monitoring data and interviews with EE beneficiaries found that most projects were progressing broadly as expected or were now operating as expected.

There is, however, a stronger thread of evidence present in the interview programme. The views of the three closed energy efficiency deployment projects that were interviewed as part

of the study were unanimous in supporting the programme theory that IETF grants bring payback for energy efficiency within an investable range. Project beneficiaries stated:

> *"The grant enabled deployment by lowering the financial barrier and lowering the payback period for EE deployment." - Project beneficiary, with a closed energy efficiency deployment project*
>
> *"Without IETF, we probably wouldn't have put the equipment in at that time, possibly in the future but that wouldn't have been definite" - Project beneficiary, with a closed energy efficiency deployment project*
>
> *"The IETF helped lower the financial hurdle to deployment…These projects wouldn't have progressed without the funding… It has definitely shortened the payback period" - Project beneficiary, with a closed energy efficiency deployment project*

All three stakeholders agree, which provides relatively compelling evidence to support the programme theory set out in the Theory of Change.

Causal Pathway for ToC Supplement indicator #14 and indicator #18

> The TOC Supplement Indicator #14 causal narrative is:
>
> *Grants are allocated to good quality Deep Decarbonisation Deployment Projects* **(Box 10)** causes *the grant makes the (riskier) lower carbon project more financially applicable to first movers (financial barriers is overcome)* **(Box 14)** because *successful DD deployment projects are delivered as planned.*
>
> The TOC Supplement Indicator #18 causal narrative is:
>
> *The grant makes the (riskier) lower carbon project more financially applicable to first movers (financial barriers is overcome)* **(Box 14)** causes *IETF-funded DD tech were installed and became operational as expected* **(Box 18)** because the *risk of financial loss for a business investing in DD technologies is abated and becomes financially viable for businesses.*

Only three DD projects had concluded at the point of the evaluation fieldwork. As a result, there is very little substantive evidence to interrogate. However, the interviews did collect evidence from beneficiaries delivering decarbonisation deployment projects. All decarbonisation deployment interviewees were positive about the impact of the IETF grant for their projects and identified the funding as important for overcoming anticipated poor payback periods.

This stakeholder group did identify specific areas where the IETF funding incentivised them to invest in novel equipment that would otherwise have not been purchased. Phrases that were used included:

> *"…funding has given more confidence to try this relatively new technology..."*
>
> *"…enabled the company to purchase a specialized machine that they would not have afforded otherwise..."*
>
> *"…without the funding, the project would have been delayed for years until the current equipment neared the end of its life..."*

This suggests that in the cases highlighted, the IETF decarbonisation deployment grant incentivised project teams to try innovations in their businesses ahead of when their business-as-usual planning may have allowed.

Causal Pathways – Activities to Overcoming Barriers to Outputs – capability barriers

This section provides evidence to demonstrate how and why the causal pathways between activities and overcoming capability barriers (shown in Figure 19 below) have occurred. The specific causal pathway in focus relates to knowledge and demonstration spillovers to wider industry as a result of the programme.

Causal Pathway for ToC Supplement indicator #15

> The TOC Supplement Indicator #15 causal narrative is:
>
> *BEIS [now DESNZ] facilitates knowledge-sharing* **(Box 11)** with *knowledge [that] is gained by project beneficiaries, consultants and engineers about 'best practice' deploying DD technologies and their associated costs and benefits* **(Box 19)** overcomes *a lack of knowledge and skills to deliver Deep Decarbonisation deployment technologies (capability barrier is overcome)* **(Box 15)** because *knowledge about DD tech, including deployment best practices and costs and benefits is gained and shared across organisational boundaries,* through DESNZ stakeholder engagement events, published case studies of successful deployment projects and organically from the movement of consultants and engineers involved with IETF projects to non-IETF-funded firms.

Figure 19 Causal pathway – overcoming capability barrier
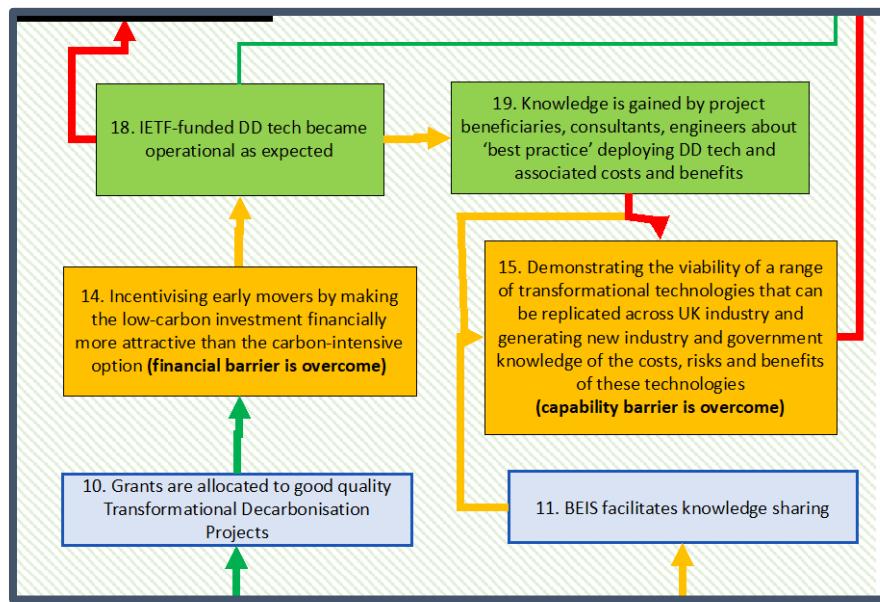
The rest of this section splits the causal pathway into two elements: knowledge spillovers from DESNZ knowledge sharing activities to wider industry, and knowledge spillovers facilitated by projects to wider industry through non-DESNZ channels.

Spillovers from DESNZ facilitates knowledge sharing

Survey evidence presented in Figure 20 below shows that exactly half (**50%**) of the 34 respondents agreed that they have shared knowledge and learning from their project through DESNZ events (or other government stakeholder engagement events). This can include both the showcase events described above and attendance at briefing events for new phases of the IETF programmes. In both cases, project teams were invited to demonstrate the positive effect that the IETF grant had on their business. The data below suggests that this was the primary channel by which knowledge sharing occurred through the IETF programme.

Figure 20 Mechanisms for sharing knowledge and learning from IETF projects across organisational boundaries
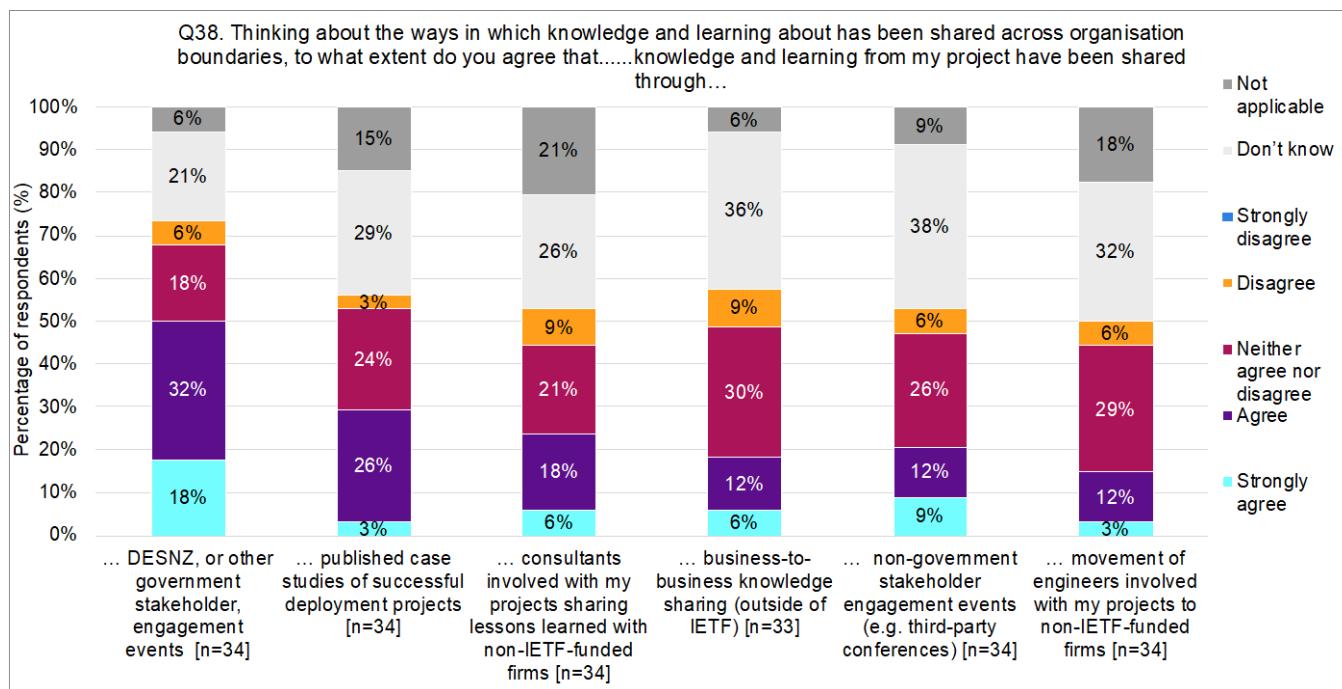
Source: Technopolis survey

However, interview evidence from beneficiaries suggests that this data point may overstate the role of DESNZ events in promoting knowledge spillovers from the programme as interviewees were typically cooler towards the role it had in promoting knowledge sharing. Figure 21 shows that around **40%** of stakeholders agreed that DESNZ/ government has supported project teams to engage in sharing the benefits of their project more widely.

Figure 21 Role of DESNZ in sharing benefits of project with wider industry
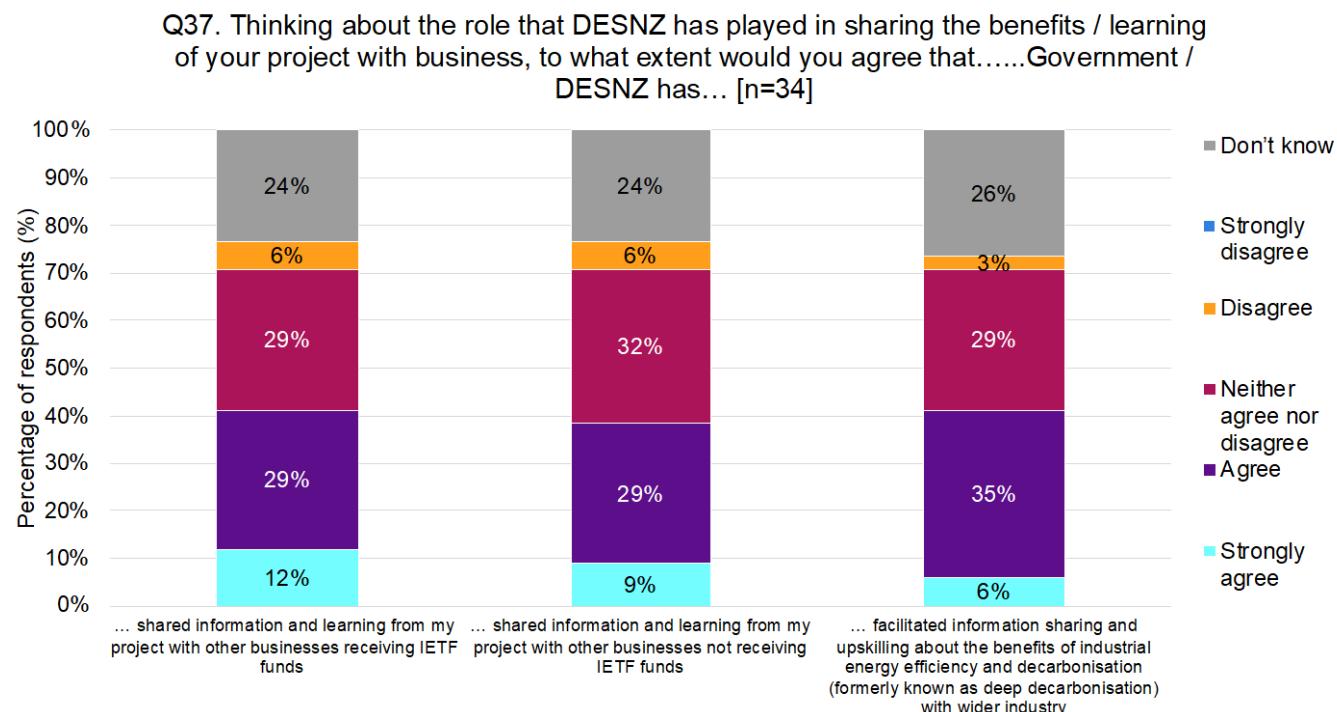
Source: Technopolis survey

Results from the evaluation survey (Figure 22) show that **92%** of survey respondents have shared information and learning within their organisation.

This dropped to around **50%** when respondents were asked if they had shared learning with other businesses, and across sectors. Whilst these results were clearly supported in the main by interview evidence, beneficiary stakeholders identified that the drop off was down to three primary factors:

- a) Caution around sharing intellectual property with competitors in their industry that may result in giving up a competitive edge.

- b) Projects had not yet completed, and projects have yet to actively disseminate learnings outside of organisation/ consortium teams.

- c) Projects did not produce learnings as they were straightforward projects and well understood by project teams and suppliers.

Figure 22 Beneficiary views on cross organisation knowledge sharing

Q36. Thinking about sharing the benefits / learning of your project at a business to business level, to what extent would you agree that information or learnings have been shared…. [n=35]

■ Strongly agree   ■ Agree   ■ Neither agree nor disagree   ■ Disagree   ■ Strongly disagree   ■ Don't know

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
… with other businesses – not receiving IETF funds	9%	43%	31%	9%		9%
… with other businesses receiving IETF funds	9%	40%	26%	9%	3%	14%
…with other businesses – across sectors	11%	37%	29%	11%		11%
… within your organisation	49%	43%	3%	3%	3%	

Percentage of respondents (%)

Source: Technopolis survey

Interviewed beneficiaries identified several routes to sharing learning from the programme that are not captured in the data presented above. These are explored further in the section below.

Knowledge spillovers from beneficiaries (non-DESNZ channels)

IETF grants have supported knowledge building and upskilling related to DD technologies for beneficiaries as well as consortium partners, and the project supply chains. These supply chains include both equipment providers, and technical consultants. This has occurred primarily by grants facilitating time for individuals involved in the projects to engage with new technologies / equipment.

Whilst most knowledge and learning activity has been internal to organisations delivering the project, interview evidence has identified suppliers and trade bodies/ industry associations as key mechanisms that have enabled knowledge spillovers to wider industry.

Interviews with beneficiaries identified that both equipment providers and technical consultants are conduits for knowledge spillovers but with slightly differing mechanisms. For example, there are positive commercial incentives for equipment suppliers (such as heat pump suppliers, but applicable to other equipment) to understand the needs of their customers (in this case IETF project beneficiaries). Equipment suppliers are therefore able to learn knowledge and skills on IETF projects that they can leverage when liaising their other customers as part of a collaborative supplier-buyer relationship. Beneficiaries highlighted this mechanism for overcoming the capability barrier in the wider market through equipment suppliers, saying:

> *"Suppliers of the electrical equipment [used in the IETF project] are now supplying a lot more electrical equipment in this sector" - Project beneficiary*
>
> *"[The IETF project] has supported knowledge and experience of heat pumps among our suppliers. We found it hard to source the heat pump equipment and*

> *knowledge - but this project gave our existing suppliers [supplier name] the opportunity to work with heat pumps"* - Project beneficiary
>
> *"The equipment supplier involved in the project experienced a learning curve themselves – furthering our expertise in implementing novel solutions such as heat pumps and mechanical vapor recompression systems"* - Project beneficiary

Echoing this, one beneficiary also identified that that at this stage there had been no knowledge spillovers but expected them to possibly materialise through their suppliers.

Beyond equipment suppliers, consultancies in the IETF project supply chains are a key mechanism by which the supply chain is supporting the dissemination of knowledge to the wider sector. Survey data identified that only **24%** of project beneficiaries agreed or strongly agreed that consultants were sharing knowledge and learning (see Figure 20 above). However, the interviews revealed that consultants were being upskilled during IETF projects, and there were examples where consultants had experience from previous IETF grants and were able to provide technical support to new applicants.

For example, one beneficiary flagged that their external consultant had recruited PhD graduates to focus on hydrogen solutions in response to their work supporting the IETF funded project. This suggests that the consultancy is leveraging experience and lessons learned from the IETF project for future work with other similar deployment opportunities using hydrogen.

In a small number of instances, consultancies were the main contact on the application and were therefore contacted during the fieldwork. These stakeholders provided important insights into how consultancies acted to support their customers. In one case, one of these consultants stated that they had developed relationships with equipment suppliers via their participation in an IETF grant. However, one consultant who supported several project beneficiaries described how their position as a conduit for sectoral learning has to carefully respect the interests of their different clients:

> *"[We are] careful to not direct clients to a favoured supplier or technology. We have tried to be agnostic and focus on tailored solutions and benefits for client"*
> *– Consultant, interviewed in role on project team, acting on behalf of a project beneficiary*

A limitation of the fieldwork is that it did not interview a large number of consultancies in the sector. As such, the extent of this mechanism is not fully understood. Further work to fill this evidence gap could be undertaken in future testing of the Theory of Change.

Several project beneficiaries highlighted that trade associations had been forums for knowledge sharing beyond the IETF. Trade bodies highlighted specifically by beneficiaries

included: IDRIC[49], CCSA[50], Hydrogen UK[51], Cold Chain Federation[52], Institute of Refrigeration[53], Ceramics UK[54], and Cepi[55]. Whilst beneficiaries were able to point to activities that they had undertaken to disseminate knowledge to industry niches, most stakeholders were fairly reserved about the extent to which this approach has already led to wider uptake of knowledge in the sector.

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[49] https://idric.org/netzero-industry/
[50] Carbon Capture & Storage Association - https://www.ccsassociation.org/
[51] https://hydrogen-uk.org/
[52] https://www.coldchainfederation.org.uk/
[53] https://ior.org.uk/
[54] https://www.ceramics-uk.org/
[55] Confederation of European Paper Industries - https://www.cepi.org/

Conclusions

Process Evaluation Conclusions

This study conducted a final process evaluation of Phases 1 and 2 of the IETF. The study was conducted in the second half of 2024 when the majority of Phase 1 and Phase 2 projects had been awarded and were underway, with a small section of projects completed.

The study generated the following assessments and conclusions against the specific research themes:

Attractiveness of the IETF offer:

The IETF was seen by the majority of beneficiaries as an attractive offer, supporting studies and the deployment of mature technologies at scale. The majority of beneficiary motivations were financial and related to reduced payback times and reduced risk. Decarbonisation was a closely related primary motivation as many firms respond to policy and market demand for low carbon products. Most responses indicated that projects would not have gone ahead without IETF support.

While the fund was seen as broadly positive and attractive, the complexity of the application and grant administration requirements were seen as barriers to applying or reapplying. Timing was also highlighted by some beneficiaries as an aspect which may be strengthened to optimise predictability and alignment with business operations, planning, and multistage engineering works (e.g. from FEED through to deployment).

A limitation of the study is recognised in that non-applicants and unsuccessful applicants were not consulted.

Application process:

The application guidance was seen by beneficiaries as high-quality with a range of forms of support provided by DESNZ. Most beneficiaries relied primarily on the applicant guidance document combined with email support for clarifications.

The evaluation produced strong evidence to indicate that the complexity of the application posed a challenge. Beneficiaries cited time and resource constraints as the main barrier to applying, due to the size of the application. These barriers appear to have disproportionately affected smaller companies with limited internal expertise, whilst larger companies, particularly those with prior grant experience, navigated it more easily.

Linked to the high level of application burden, there was a common reliance on consultants to support bid preparation, who are also identified in the Theory of Change analysis as a key mechanism for cross-project and cross-company learning.

The user friendliness of the application portal was seen to improve between Phase 1 and 2, however, the Phase 2 application was viewed as becoming longer and duplicative. Efforts have been made by DESNZ to lower barriers to entry for smaller companies through measures such as the email clarification service which were viewed positively.

Again, a limitation of the study is recognised in that non-applicants and unsuccessful applicants were not consulted.

Assessment, due diligence and pre-application support:

Beneficiaries generally reported that the assessment criteria were clear and consistently applied. Assessors generally viewed the scoring criteria as rigorous and high quality, however, did agree that it was complex and challenging to apply particularly for assessments of additionality. The assessment structure appears to be well structured and robust, with eligibility, technical and financial assessments complemented by moderation meetings and an award panel to balance the overall portfolio of grants.

There is moderate evidence and mixed views around the benefits of the financial and technical due diligence. Whilst some beneficiaries found the process useful, the majority viewed it as burdensome and contributing unnecessarily to long award timelines.

Award timelines of 6-9 months were identified as problematic for several applicants, resulting in some withdrawals from the programme, and contracted timelines for project delivery.

The delivery team recognised that application assessment and due diligence is demanding but viewed it as necessary to provide assurance of public grants, particularly in the context of high TRL levels which are generally treated with lower risk tolerance compared to innovation grants.

Project Delivery:

Overall, there is good evidence that grant administration processes are well designed to support project level progress across the grant portfolio. However, payment claims and change requests were often seen as somewhat burdensome by beneficiaries. Beneficiaries of larger grants typically viewed the reporting requirements as more proportionate. Beneficiaries found quarterly progress reviews useful for sharing information and receiving guidance, and the format of quarterly review meetings was viewed as improving between phases, become more structured and less burdensome on beneficiaries in terms of the amount of information requested.

Monitoring officers (MOs) reflected that light touch quarterly project monitoring led to gaps in the DESNZ understanding of project risks, and also reported few options to support struggling projects other than extending timelines. MOs also faced challenges assessing Milestone Payment Claims due to a lack of detail/criteria available to confirm eligibility of expenditure.

Support provided by DESNZ and technical contractors is viewed positively by beneficiaries. DESNZ and external contractors maintained a good relationship in delivering monitoring

activities, though some overlap in roles in early stages occasionally led to a less efficient delivery.

Benefits monitoring - Monitoring & Verification (M&V):

It is difficult to draw strong conclusions on M&V performance in terms of its suitability for measuring emission and energy data as only a small number of projects had entered the benefits monitoring stage at the time of the study. However, delivery team, technical monitoring officers and beneficiaries generally view the systems as robust and well designed to capture performance data.

IETF participation appears to have increased M&V activity across all company sizes. There were mixed views among beneficiaries on the proportionality and usefulness of M&V for project delivery. Overall, a majority appear to find M&V requirements proportionate and useful for monitoring project performance. There was a significant minority, however, who felt M&V requirements were overly burdensome or duplicative of existing M&V efforts suggesting a potential need for better scaling and tailoring of M&V plans based on project size and complexity. Larger firms tended to more often have existing M&V systems in place, which either complemented or caused duplication with IETF M&V.

The support provided in developing M&V plans was considered by beneficiaries to be good quality, and in some cases helped build capacity of smaller firms to measure energy and emissions performance. The M&V process was seen to have been iterated and improved throughout competition phases, leading to improved support and more detailed M&V templates.

Alignment with transition to New Zero:

The IETF was recognised by study participants as largely fulfilling its intended objective within the UK net zero strategy by supporting industrial decarbonisation and energy efficiency through the deployment of established technologies at scale.

There is evidence that the IETF is effective in helping to accelerate the execution of decarbonisation and energy efficiency strategies among participating firms, helping them realise ambitious goals such as hydrogen deployment or fuel switching. However, firms also often stated that the overall ambition of their strategies has not changed, with the contribution instead being related to execution and acceleration of existing ambitious strategies.

There is good evidence that the programme is effective in incentivising multinational companies to prioritise decarbonisation investments in their UK subsidiaries, enhancing the UK's competitive position within global corporate structures.

Improvements to programme processes set out above could further strengthen the role of the IETF in supporting the UK's net zero strategy in the area of industrial decarbonisation.

Theory of Change Assessment

Theory of Change broadly holds true

Overall, the IETF Theory of Change broadly holds true at this stage of delivery (noting most projects are still live and not yet complete). There is strong evidence to support that the IETF Theory of Change remains fit for purpose. There is strong evidence that supports inputs and activities have been performed as set out in the Theory of Change. Programme data demonstrates that DESNZ time and capital, private capital and the time and resources of applicants and their supply chain have been directed into the IETF. Applicants have submitted good quality proposals to the scheme and these proposals have been converted into good quality projects.

Strong evidence for overcoming financial barriers

Studies have begun to lead to a pipeline of projects in the sector, though evidence is still emerging in this area, whilst there is clear evidence that IETF funding has accelerated energy efficiency deployment projects that otherwise may not have been undertaken or would have been delayed by several years. Funding for decarbonisation deployment projects has supported organisations to try novel technologies for existing processes that they otherwise may not have considered.

Mixed evidence for overcoming capability barriers

There is some emerging evidence to demonstrate that capability barriers have been overcome, and there is evidence of knowledge being developed and disseminated by the programme through a variety of mechanisms.

Project teams took part in knowledge sharing activities, such as technology showcases, facilitated by the programme. Knowledge sharing through non-DESNZ activities, such as interactions via trade bodies, has also taken place.

Learning among projects across the portfolio was often reported to have been limited, reflecting the high TRL level and deliverability requirements within the application. However, learning and capability development was reported by a range of projects across the portfolio. Decarbonisation projects were more likely to report learning than EE, though some energy efficiency projects also reported learnings, study projects were more likely to report learning than deployment projects. Learning among projects typically occurred as a result of funding allowing dedicated personnel time and access to new equipment. Consortium partners and supply chains were also found to be an important source of new expertise.

Wider knowledge spillovers to industry from projects have been observed, predominantly through relationships with the industry supply chain. Equipment suppliers who provided technology solutions are learning from IETF projects, whilst a consultant eco-system has formed around the programme which was identified as a key mechanism for project level learning and spillovers to wider industry.

Appendices

Annex A – Technical Annex

Annex B – DESNZ IETF Theory of Change Supplement.xlsx

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