Specification: Lot 2 - Cross-Programme Evaluation of NZIP Industry & Hydrogen programmes

# **Introduction and summary of requirements**

This contract is for the delivery of one evaluation that covers all seven of the following Net Zero Innovation Portfolio (NZIP) programmes related to industry and hydrogen:

* Industrial Fuel Switching (NZIP) (IFS)[[1]](#footnote-2)
* Red Diesel Replacement (RDR)[[2]](#footnote-3)
* Green Distilleries (GD)[[3]](#footnote-4)
* Industrial Energy Efficiency Accelerator (IEEA)[[4]](#footnote-5)
* Industry of Future Programme (IFP)[[5]](#footnote-6)
* Industrial Hydrogen Accelerator (IHA)[[6]](#footnote-7)
* Low Carbon Hydrogen Supply 2 (HyS2)[[7]](#footnote-8)

The programmes are part of DESNZ’s £1 billion Net Zero Innovation Portfolio[[8]](#footnote-9) (NZIP), which aims to accelerate the commercialisation of innovative clean energy technologies and processes through the 2020s and 2030s.

This contract has been scoped alongside a contract procuring another cross-programme evaluation which covers the NZIP Greenhouse Gas Removals programmes. Both contracts will be procured separately to ensure that the contract and workload are a manageable size. However, the same methodology has been used in both contracts. This is appropriate due to the similar delivery style of the programmes across NZIP despite the programmes delivering different technological development.

Industrial decarbonisation is a core element of the UK’s commitment to eliminate, net, all carbon emissions from UK sources by 2050. To meet this target, emissions associated with industry could need to drop by 87-96% compared to 2019, according to the Net Zero Strategy[[9]](#footnote-10). Low carbon hydrogen has the potential to play a key role in enabling the transformation of the UK’s industrial regions[[10]](#footnote-11). In the Energy Security strategy, government set out its ambition for hydrogen production to increase to 10GW by 2030 [[11]](#footnote-12).

The seven innovation programmes in scope for this evaluation aim to support delivery of the commitments set out in the Net Zero, and other, strategies. These programmes, which sit within the ‘Industry’ and ‘Hydrogen’ NZIP themes, differ to some extent in their programme-level objectives. However, they are broadly aligned in that they each aim to enable decarbonisation in a variety of difficult- or expensive-to-decarbonise areas, by developing innovative solutions to:

* Accelerating commercialisation
* Switching fuels in a range of high-energy industrial processes
* Improving industrial energy efficiency
* Increasing carbon savings potential
* Strengthening supply and value chains and reducing supply costs
* Developing standards, knowledge, awareness, and skills

**This evaluation will:**

* Assess the relevance, coherence, effectiveness, efficiency, impact and sustainability of the programmes and their funded technologies, in line with the OECD framework for evaluation[[12]](#footnote-13).
* Use research methods such as interviews, expert reviews, small online surveys and economic analysis to produce three reports on the seven programmes, to feed into policy and other decision-making points from Autumn 2025 to Autumn 2028.
* Produce a set of project and thematic-level case studies.

# **Background: policy and programmes**

## Policy background

Industry sectors are highly emitting and combined produce 16% of UK emissions[[13]](#footnote-14). According to the Net Zero Strategy, by 2050, these emissions associated with industry could need to drop by 87-96% compared to 2019 [[14]](#footnote-15). However, decarbonisation creates challenges for industry as many low carbon technologies are in early stages of development and are therefore some way from commercialisation[[15]](#footnote-16).

Low carbon hydrogen can be a versatile replacement for high-carbon fuels, reducing emissions in UK industrial sectors and providing flexible energy for power, heat and transport[[16]](#footnote-17). However, there is currently almost no low carbon hydrogen production in the UK or globally, so meeting this ambition will require rapid and significant scale up[[17]](#footnote-18). Consequently, research and innovation are an important part of ensuring the development of these technologies and solutions to deliver Net Zero.

## Programmes

All five innovation programmes delivered through the NZIP theme “Industry” will be included in this evaluation. These programmes aim to address technical barriers and challenges by investing in the development of practical demonstration of fuel switching technologies and processes to deliver the technologies necessary for industrial decarbonisation[[18]](#footnote-19).

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| --- | --- | --- | --- |
| Programme | Number of phases and projects | Funding | Programme delivery timing |
| Industrial Fuel Switching (NZIP) | Phase 1 (feasibility): 22  Phase 2 (demonstration): 13 | £55 million | Phase 1: Mar-22 – Oct-22  Phase 2: Mar-23 – Mar-25 |
| Red Diesel Replacement (RDR) | Phase 1 (feasibility): 17  Phase 2 (demonstration): 6 | £40 million | Phase 1: Mar-22 – Mar-24  Phase 2: Jul-23 – Mar-25 |
| Green Distilleries (GD) | Phase 1 (feasibility): 17  Phase 2 (demonstration): 4 | £10 million | Phase 1: Dec-20 – Mar-21  Phase 2: Dec-21 – Mar-24 |
| Industrial Energy Efficiency Accelerator (IEEA) | IEEA 3: 8  IEEA 4: 7 | £8 million | IEEA 3: Sep-22 – Mar-25  IEEA 4: Feb-23 – Mar-25 |
| Industry of Future Programme (IFP) | 1 (report) | £1.58 million |  |

Two of the innovation programmes being delivered through the NZIP theme “Hydrogen” have also been selected to be included in this evaluation. Hydrogen is critical to helping vital UK industries transition from oil and gas, and can provide greener energy for power, transport and buildings[[19]](#footnote-20). These programmes aim to develop and deliver the technologies necessary for scaling up hydrogen production.

|  |  |  |  |
| --- | --- | --- | --- |
| Programme | Number of phases and projects | Budget | Programme delivery timing |
| Industrial Hydrogen Accelerator (IHA) | Stream 1 (demonstration): 1  Stream 2a (feasibility): 9  Stream 2b (FEED/demonstration): 2 | £13 million | Stream 1: Nov 22 – Mar 25  Stream 2A: Sept 22 – Feb 23  Stream 2B: May 23 – Mar 25 |
| Low Carbon Hydrogen Supply 2 (HyS2) | Phase one (feasibility): 23  Phase two (demonstration): 10 | £60 million | Jan-22 – Mar-25 |

### Industrial Fuel Switching programme (NZIP)

IFS2 aims to develop industrial fuel switching solutions for industrial decarbonisation. It is delivered in two phases, the first funding feasibility studies and the second demonstration projects. ​The programme is split into three lots: Hydrogen; Electrification; and Biomass, waste and other. The programme has the following objectives:

1. Demonstrate potential for industrial greenhouse gas (GHG) emissions reduction via industrial fuel switching technologies for industry to reach Net Zero by 2050 and align with 10 Point Plan commitments.
2. Demonstrate the potential commercial viability of industrial fuel switching solutions, related to deployment cost reductions, energy efficiency improvements and future market size.
3. Gather evidence to inform future industrial decarbonisation policy making to feed into the Industrial Energy Transformation Fund, electrification of industry, hydrogen in industry, and other Industrial Decarbonisation Strategy policies.
4. Increase awareness of potential industrial fuel switching solutions and technologies, by collecting and disseminating findings across industry and investors.
5. Strengthen supply chains and skills for industrial decarbonisation around the UK.

### Red Diesel Replacement (RDR)

RDR aims to demonstrate low carbon and commercially viable alternatives to low-tax diesel (also called red diesel) for non-road mobile machinery sectors (mining and quarrying, and construction). The programme is delivered in two phases, with Phase 1 focusing on component technology development projects across three innovation lots (fuel development; distribution, storage and refuelling systems development; and vehicle development of vehicles (components/sub-systems) and fleet management infrastructure), and Phase 2 focusing on end-to-end demonstrations at construction and mining & quarrying sites.

The objectives of the Red Diesel Replacement programme are described as follows:

1. To develop commercially viable and globally applicable low-carbon alternatives to Red Diesel.
2. To demonstrate an integrated, low-carbon solution at a moderate scale on-site for the quarrying and mining sector, and the construction and building sector.
3. To disseminate the learnings and results of the Red Diesel Replacement programme to international stakeholders, industry and other diesel-using sectors.
4. To inform policy teams on the potential of these low-carbon alternatives and create awareness of the spin-off opportunities for other sectors (e.g. aviation and HGVs).
5. To deliver match funding from industry.
6. To accelerate the commercialisation of low-carbon Red Diesel alternatives.

### Green Distilleries (GD)

GD targets the distilleries sector or technologies that can support the decarbonisation of the distilleries sector. It is delivered through a two-phased SBRI approach, Phase 1 funding feasibility studies, and Phase 2 funding demonstration projects. The programme has four objectives:

1. Further understanding of technical feasibility of fuel switching/enabling technologies
2. Successfully demonstrate fuel switching/enabling technologies
3. Develop industry and market awareness of fuel switching/enabling technologies
4. Build an evidence base to improve departmental knowledge for industrial decarbonisation

### Industrial Energy Efficiency Accelerator (IEEA)

IEEA provides grant funding for industrial energy and resource efficiency technology developers to work with industrial sites to install, test and prove their equipment. The purpose is to fund innovative technologies that will reduce energy use and greenhouse gas emissions from industry.

This programme delivers two further rounds of a programme originally delivered under the NZIP’s predecessor, the Energy Innovation Programme (EIP). IEEA is managed by the Carbon Trust, which also carries out a light-touch assessment of the projects’ energy efficiency improvements.

The programme has the following objectives:

1. Successfully demonstrate and prove the energy savings from innovations, across a range of industrial sectors.
2. Leverage private sector investment into near to market industrial energy efficient technologies and processes.
3. Overcome barriers associated with the reluctance of industry to install alternative low carbon innovations. This will lead to a decrease in persistent market barriers, which will lead to future investments in these energy efficient innovations, by producing technologies that are market ready with businesses capable of achieving sales within 2 years of grant award.
4. Strengthen UK supply chains for industrial efficiency technologies and processes, and better understand UK capabilities and gaps in manufacturing of these technologies.
5. Shape a competitive business environment for UK energy intensive industries, by increasing their efficiency and productivity and reducing fuel use.

### Industry of Future Programme (IFP)

The Industry of Future Programme (scoping study) aims to develop technology solutions and implementation plans for industrial sites through the creation of Net Zero industrial decarbonisation roadmaps. The findings from the roadmaps will increase government and market understanding of site and sectoral technology gaps. The summary report findings have been published and can be seen here: [Findings of the Industry of Future Programme - GOV.UK](https://www.gov.uk/government/publications/findings-of-the-industry-of-future-programme). The programme has the following objectives:

1. Develop innovative technology solutions and implementation plans for several sites, through the creation of technology roadmaps.
2. Increase government and market understanding of site and sectoral technology gaps, availability and decarbonisation impact through the publication of the Scoping Study Overview Report.

### Industrial Hydrogen Accelerator (IHA)

The IHA funds the demonstration of end-to-end industrial fuel switching to hydrogen. The scope of the programme includes the full technology chain, from hydrogen generation and storage through to industrial end-use, including the integration of the components in a single project. The programme funds demonstrations of hydrogen implementation at dispersed sites (i.e. outside industrial clusters); for example, electrolysers co-located with high temperature gas-fired processes. Projects include stakeholders with expertise across the project lifecycle and components being integrated, including technology developers and industrial sites.

The programme has the following objectives:

1. Improve project stakeholder understanding of how to design, implement and deliver a hydrogen solution on a specific industrial site, through the completion of feasibility reports on how industrial process can implement end-to-end hydrogen solutions, by early 2023.
2. Prove the feasibility and provide evidence towards the cost effectiveness of hydrogen fuel switching, through the successful demonstration of at least one hydrogen end-to-end system in an industrial process.
3. Develop stakeholder knowledge, confidence and awareness of hydrogen end-to-end system solutions in industry through the publication of feasibility studies and a demonstration study
4. Facilitate the development of new commercial relationships and build market awareness of industry actors, through holding at least one match making event, as well as at least one dissemination event, in order to remove co-ordination barriers in the hydrogen market.

### Low carbon Hydrogen Supply (HyS2)

HYS2 is a two-stream competition providing funding for hydrogen supply projects. It aims to identify, support and then develop credible innovative hydrogen supply or enabling technologies to bring about a step change in their development, reducing the costs of supplying hydrogen, bringing new solutions to the market, and ensuring that the UK continues to develop world leading hydrogen technologies for a future hydrogen economy. HYS2 builds upon the success of the Hydrogen Supply programme, although no longer focusing solely on bulk production of hydrogen and more clearly targeting lower TRL technologies (developing challenger technologies to the incumbents).

The programme has five objectives as follows:

1. Reduce cost of hydrogen supply
2. Increase carbon savings potential
3. Develop novel technologies to increase market competition
4. Knowledge building to inform policy development
5. Develop the knowledge and the skills required to meet net-zero

# **Evaluation Coverage**

The seven programmes will be evaluated together to produce a cross-programme evaluation (see the table below). As a result, the evaluation will take a higher-level approach, and many of the evaluation questions suggested below aim to address the seven NZIP programmes together. However, we would expect the contractor to draw out any programme- and project-specific differences if they arise from the research, and there are also some targeted programme-specific evaluation questions. This approach means that the evaluation can explore and make clear reference to individual programmes, whilst also identifying where findings are mutually exclusive.

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| --- | --- | --- |
| **Programme** | **NZIP theme** | **Cross-Programme**  **Evaluation** |
| Industrial Fuel Switching 2 | Industry | Industry & Hydrogen |
| Red Diesel Feasibility & Demo |
| Industry of Future Programme |
| Green Distilleries |
| Industrial Energy Efficiency Accelerator |
| Hydrogen Supply 2 | Hydrogen |
| Industrial Hydrogen Accelerator |

# **Overall purpose of the evaluation**

This evaluation is being commissioned for the following purposes:

1. To enable decisions about future policies or investments driving the technological transformation to Net Zero, by Government, technology developers, industry and others
2. To enable improvements of specific aspects of the delivery of these or similar innovation programmes
3. To provide accountability to the public through publication of key findings related to the performance of the innovation investment

This evaluation will focus on understanding the funded innovations within their context, considering their aim to enable the technological transformation towards Net Zero. As a result, there is less emphasis on a comprehensive analysis of processes and attribution, and more emphasis on questions of relevance and contextual coherence.

See Appendix A for the EIP Evaluation Literature Review synthesis framework, which provides further context of the delivery process and identified pathways to impact.

It is important that the evaluation outputs are delivered at the right time to maximise their impact on key decision points, such as spending reviews and the development of future innovation programmes.

## Intended users and their use

|  |  |  |
| --- | --- | --- |
| Primary user | Evaluation use | Information need |
| Programme and theme leads (Internal DESNZ stakeholders who manage the NZIP portfolio covered by this evaluation) | Support decision making on programme focus (what), design, governance and management (how)  Communication with policy and technical stakeholders about future programmes | * (Non-technical) barriers in the roll-out of technologies * Design, governance and management how-to, with particular focus on elements that affect failure likelihood and long-term impact * Process and delivery improvements |
| Senior management within DESNZ   * Industrial decarbonisation innovation * Hydrogen innovation * NZIP * Similar innovation programmes within DESNZ | Engagement with HMT and other stakeholders on the focus and finance of future innovation programmes and portfolios  Identification of longer-term / wider risks to long-term impact | * Economic analysis * Assessment of NZ contribution * Indication of next steps * Examples of projects * Recurring / structural risks (and possible solutions). |
| Ministers | Ability to independently verify successes and barriers of innovation programme  Communicate examples and key findings / statistics to a wide range of stakeholders | * Examples of projects * Summary of evaluation |
| Policy teams in DESNZ | Identify technical barriers and limits that may limit policy choices, or conversely, breakthroughs that support others | * Detailed description of the broader barriers |
| Hydrogen sector | Understanding of experience of projects and bidders, and evidence/knowledge generated | * Technical outcomes-verified * Government strategy fits |
| Industrial sites and technical developers involved in projects | Understanding of experience of others involved and potential reasons  Independent verification of own achievements for communication purposes | * Case studies * Technical outcomes – verified * Government strategy fits |
| Industrial sites and technical developers *not* involved  Industrial sector trade associations | Making decisions about own investments in clean technologies / innovation based on findings in the evaluation  Review of experiences of innovation programmes to enable judgements about participation | * Technical outcomes – verified * Government strategy fits |
| Wider supply chain | Making decisions about own investments in clean technologies / innovation | * Technical outcomes – verified * Government strategy fits |
| Other funders of Industrial Decarbonisation and Hydrogen (IDRIC, other DESNZ funders) | Understanding the return of investment, value in developing technologies around decarbonisation. | * Impact assessments around long term impacts * Economic analysis |
| Public | Obtain assurances about the value for money achieved by government spending | * Economic analysis * Impact on the environment * Impact on public health * Potential creation of future jobs |

# **Evaluation Questions**

The evaluation questions have been developed using the OECD’s DAC evaluation criteria framework[[20]](#footnote-21). The rationale behind using this framework is that it sets out six evaluation criteria that provide complementary perspectives, giving a holistic picture of the programmes, their implementation, and results. This framework allows for a broader assessment of whether the programmes have helped DESNZ move closer to its long-term goal of reaching net zero by 2050. Note that the evaluation questions are **not** set out in order of priority.

Where reference is made to outputs, outcomes and impacts, these refer to:

* Outputs: the outputs directly produced as part of the project or programme, e.g., a demonstrator built.
* Outcomes: the short- to medium-term outcomes achieved, e.g., changes in industry views on routes to decarbonisation.

Impacts: the longer-term changes influenced by the projects and programmes, e.g., cheaper decarbonisation.

Bidders may also consider utilising the EIP Evaluation Literature Review synthesis framework (Appendix A) to contextualise and understand these evaluation questions.

### Relevance – Are the programmes and projects doing the right things?

1. Are the programmes and projects addressing the most pressing **technological challenges** (including those set out in the programme business cases) around industrial decarbonisation and/or hydrogen supply? What are the remaining gaps?
   1. To what extent are the programmes and projects supporting the attainment of the Net Zero pathways as set out in the government’s Industrial Decarbonisation Strategy[[21]](#footnote-22) or the Hydrogen Strategy[[22]](#footnote-23), taking account of how many R&D cycles are left before 2050?
   2. To what extent do industry stakeholders see the government’s push on technological innovation, and the specific technology areas targeted, as relevant to their business and decarbonisation plans (if any)? What gaps exist in the innovation programme from an industry perspective? It might be useful to consider progress internationally in the relevant technologies.
2. To what extent are **non-technical** barriers (considering barriers that government can control and barriers that government is unable to control)to the commercialisation of the funded technologies addressed via the NZIP or elsewhere (consider, for innovators and technology users: Skills, finance and investment, interest and engagement, informed demand, regulation and policy barriers, resources and capabilities (including supply chain issues), innovation culture, networking and collaboration, any sector-specific elements)? Could NZIP have reasonably addressed any of these barriers? These non-technical barriers will be specified through stakeholders or the programme business cases.

### Coherence – How well do the programmes and projects fit?

1. To what extent do the programmes and their projects covered by the evaluation jointly create a **coherent approach** to ‘technology innovation for industrial decarbonisation and/or hydrogen supply? Are there contradictions or unnecessary overlaps?
2. How well do the programmes and their projects **fit and link with non-NZIP technology innovation funding programmes**? What funding gaps remain, if any, for a coherent set of initiatives to speed up the development, commercialisation and implementation of industrial decarbonisation and/or hydrogen technologies?
3. To what extent do **non-innovation programmes and policies** aiming to drive and support industrial decarbonisation and/or hydrogen supply (e.g. IDRIC) **align and link with** the NZIP innovation programmes and their projects? What implications do any misalignments or contradictions have for industrial decarbonisation, hydrogen supply and/or net zero pathways’ timescales?

### Effectiveness – Are the programmes and their projects achieving their objectives?

*This question refers to the direct objectives (outputs and outcomes) that have occurred during the programme, and that the programme and projects have direct influence over.*

1. To what extent have the programmes and, separately, their projects **achieved their** **objectives** (i.e. what they explicitly set out to achieve as set out in the programme business case / project application)? Were objectives realistic? What barriers were encountered? Did the programmes or projects result in any unintended effects? How well do the programmes convert inputs to outputs in relation to the costs? Considering specifically:
2. Altering the technology landscape in terms of available technologies, the unit cost of using them, the experience and evidence of their use (usually by progressing the funded technologies through TRLs)
3. Moving towards successful commercialisation, including increasing their Commercial Readiness Level (CRL), stimulating investment, achieving sales, generating IP or, where relevant, creating tighter integration into industrial sites or the energy network
4. Building networks, understanding, capability and capacity in the industrial, and technology sectors involved in the programmes, both up- and down-stream
5. How well are the following specified aspects of **NZIP processes** working and what lessons can be learnt? *Please note that this evaluation does not include a comprehensive process evaluation. Previous evaluations of NZIP have conducted process evaluations and have generated similar results so further detailed work is not needed.*
   1. What do programme and project leads report to be the key barriers to successful delivery?
   2. How well are programme managers dealing with unexpected technological challenges?
   3. What impact did the use of phased programme designs have on technology innovation? What is the evidence for using / not using phased approaches?
   4. What scope is there to carry out more pre-portfolio preparation, so that new programmes can become live quicker in a new Spending Review period?

### Efficiency – How well are resources being used?

1. To what extent did the portfolio of programmes provide an **efficient route to outcomes and impacts**? How efficient are the main alternative approaches likely to have been (alternatives to be determined during research, but including no government support)? How well are the outputs from an intervention providing an efficient route to outcomes and impacts in relation to the costs?

### Impact – What difference does the intervention make?

*This question focuses on sector-wide change, changes occurring post-programme and changes that are beyond the direct objectives (outputs and outcomes) of the programme. This question is important for understanding the extent to which the programmes are making a difference and contribution to reaching net zero emissions by 2050.*

1. How effective have the innovation programme and projects, and their dissemination activities, been in **changing understanding, views, plans, actions and, where relevant, emissions** across key stakeholders, particularly in industry? Are there differences between groups that are important for understanding how technical challenges might best be addressed? Considering specifically:
   1. Altering sector-wide understanding of and confidence in funded technologies through disseminating findings and experiences to key stakeholders
   2. Establishing the post-programme development and commercialisation of the technologies, including building partnerships, raising further funding, generating sales, developing UK supply chains, lowering the cost of technology etc.
   3. Supporting the development of appropriate policies and regulation, enabling policy choice (options value)
   4. Stimulating post-programme benefits such as economic growth, job creation, skills and capabilities and reducing emissions, lowering the cost of the technology
2. To what extent are the funded projects on route to being **commercially successful**? What are the main determinants / barriers to future commercial success? Consider specifically: Skills, finance and investment, interest and engagement, informed demand, regulation and policy barriers, resources and capabilities (including supply chain issues), innovation culture, networking and collaboration, any sector-specific elements, international commercial performance.
3. To what extent have the programmes affected or contributed to **secondary outcomes**, as set out in programme business cases or identified through a “theory of change”?

### Sustainability – Will the benefits last?

1. Under what conditions are the developed technologies likely to thrive in the marketplace, and under what conditions are they less likely to? How likely are these conditions to be met? What can therefore be said about the **sustainability of the technologies**? Consider: technological readiness, adoption readiness levels, technological relevance, capital costs, revenue / running costs, demand from relevant industries, policies and regulation, timelines, capability and capacity.
   1. Which industry areas are the developing technologies most appropriate for? Do these areas differ from those originally targeted?
   2. How has the market in the targeted areas developed since the beginning of the programme? How is it likely to develop in the near-future?
2. What are the most appropriate **next steps for an innovation programme** in order to support the long-term goal of reaching net zero by 2050? Which technologies and what type of support should it consider focusing on?

## Programme-specific evaluation questions

These questions have been highlighted as important by the DESNZ programme leads, who deliver the programmes, although not all programmes have identified programme-specific questions at this stage. Some of these questions may be answered as part of the cross-programme questions already stated. However, as they have been identified as significant by those leading on programmes, we have listed them here in order to ensure that programme-specific responses are identifiable in reporting.

### Red Diesel Rebate

1. How resilient are the developed solutions to policy decisions regarding hydrogen and electrification and how are any related risks handled?
2. To what extent has the programme been able to demonstrate end-to end replacement of diesel on active construction, mining, and quarrying sites? Is this reproducible in other sectors?

### Green Distilleries

1. What can be learned from the experience of distilleries about the risks and issues related to decarbonising remote industrial sites?

### IEEA

1. To what extent has the programme increased the technology options that are available to industry to improve energy and resource efficiency, and subsequently increased carbon emission reduction potential through the adoption of these technologies?

HyS2

1. To what extent was the splitting of stream one into four technical areas successful? What worked well/less well in this approach?
2. To what extent was the splitting of the programme into two streams successful?

# **Designs and methods**

The following section sets out DESNZ’s thoughts about how the evaluation could be, rather than how it should be, delivered. This was developed for two reasons:

* Provide bidders with additional insight into the thinking around each evaluation question
* Develop an outline costing for the evaluation

Whilst there is a methodology outlined below, bidders should feel that they have room to be creative and submit distinct bids. Applicants are encouraged to propose alternative approaches and methodologies, where they believe these would better achieve the aims and objectives set out below or be more cost-effective. Alternative suggestions should be justified sufficiently to allow assessment regarding reliability and validity of the approach, and the costs relative to the proposed approach. Each bidder must only submit one final methodology and must not submit a number of options. All bids must fit within our budget, timeline and output criteria, regardless of methodology proposed. Applicants must propose approaches that are compliant with the Magenta book.[[23]](#footnote-24)

This specification deliberately does not prescribe a theory-based impact evaluation approach. Theory-based impact evaluation approaches provide powerful tools to estimate additionality in the absence of high-quality quantitatively estimated counterfactuals, and DESNZ would expect any evaluation to develop and make use of tools such as theories of change. However, the research questions above place a greater emphasis on locating the outcomes of the innovation programme within the transition to net zero (and enabling related decisions), than on determining the causal impact.

Similarly, the Department has considered the possibility of using quasi-experimental designs to assess the causal impact of the programmes and/or their projects. We consider these designs likely to be unfeasible due to:

* the small number of projects and
* the difficulty in identifying an appropriate counterfactual
* the limitations in identifying relevant and available outcome measures.

Applicants are nonetheless welcome to propose theory-based designs such as process tracing or qualitative comparative analysis, or counterfactual impact designs including any quasi-experimental designs, where they believe these would help develop valid and reliable answers to the research questions. The applicant’s approach must be proportional and relevant to the research questions.

In this suggestion, the cross-programme evaluation will be conducted using the approaches described below. How these would combine to answer the different research question is set out under the heading “Methods by research question” below, followed by a summary of the data DESNZ can provide. DESNZ suggests a combination of the following methods:

* Document and evidence reviews
* Expert advice
* Interviews or focus groups with stakeholders
* A survey of projects
* Theory of change and systems mapping
* Economic analysis
* Case studies, combining methods, but providing greater depth on some projects or topics

## Document and evidence reviews

Besides DESNZ-provided project and programme data and documentation, the evaluation should review policy documents including decarbonisation pathways relevant to industrial decarbonisation and hydrogen supply.

DESNZ believes the evaluation would also be strengthened by a wider-ranging review of (evidence-based) views on the technology requirements and priorities for industrial decarbonisation and hydrogen supply; the identification of similar innovation programmes and private initiatives outside NZIP; and a review of the drivers and barriers to successful innovation programmes, both in the UK and beyond. An initial collection of relevant literature can be provided by the Department.

## Expert advice

Many of the technologies and technology areas being addressed through the programmes covered here are very technical and have specific requirements for their wider rollout. DESNZ believes that the input of an expert advisory panel would greatly strengthen the validity of findings.

DESNZ asks that the contractor sets up such a panel, to be specified in the tender. The Department suggests approximately three members and believe that at least two should have direct energy industry experience. This is an essential requirement for this evaluation to ensure the quality of this work. The contractor should set out the contract budget ringfenced for this panel, specify how they would set up this panel, would have identified and approached suitable candidates by the point of submitting a bid. DESNZ can help with revising up the panel during the inception phase if required, but we would expect the contractor to also find their own contacts.

The panel’s aim is to help ensure the evaluation results are aligned with the technical context of the technologies. The panel will be essential in the scoping of the evaluation, making sense of the data, supporting access to other industry experts for surveys and interviews and reviewing research materials including the evaluation plan and informal and formal outputs. The panel’s role in the evaluation should be formalised in the methodology.

## Interviews or focus groups

It is expected that interviews will be undertaken with project leads (~22), project industrial partners (~22), programme leads (~7), theme management (~2) and other involved DESNZ stakeholders (~11), alongside with wider industry stakeholders (~10), the Climate Change Committee (~2), DESNZ policy staff (~10) and other innovation funding programmes’ representatives (~3), and be analysed through thematic analysis[[24]](#footnote-25). DESNZ can provide contact information for all departmental and funded stakeholders but would look only to support the contractor in identifying stakeholders from the wider field. There is a risk that some participants may be hard to contact after they have moved on from the project, especially during future follow up stages. Contractors should consider any ways to mitigate this risk.

## Survey of projects

The covered programmes contain too many projects (~139) to examine each in detail. We therefore suggest that a web-based survey of all projects is used to collect any data that is not included in DESNZ’s key performance indicator (KPI) dataset. This should consist of mainly closed questions. The Department will supply the contractor with the contact information for the project leads. See appendix B for an overview of the data collected from the projects throughout the project lifecycle. There is a risk that some participants may be hard to contact after they have moved on from the project, especially during future follow up stages. Contractors should consider any ways to mitigate this risk.

## Theory of change and systems mapping

Theories of changes for all programmes have been developed before the programmes were launched. Hence, these theories of change may need substantial updating. DESNZ expects theories of change to be developed at cross-programme evaluation level and programme level to help frame the analysis and reporting. Programme level Theories of change were devised during programme inception, and so these can form the basis of this work. A collaborative approach between the supplier and DESNZ should be enacted for Theory of Change development.

A systems map may also be useful to identify and communicate the wider risks and opportunities that programmes point to in relation to industrial decarbonisation and hydrogen supply, as well as questions on relevance and coherence of the programmes.

## Economic evaluation

The Department would like the contractor to carry out economic analysis to understand the benefits and dis-benefits of the programmes. This is to answer evaluation question eight regarding efficiency. In line with Green Book [[25]](#footnote-26) guidance, benefits can be quantitatively or qualitatively expressed. The preference is to express benefits in a quantitative way. However, in the case of benefits for which an inappropriate number of assumptions and disproportionate modelling and estimation would be necessary, then a qualitative approach is deemed suitable.

The benefits of these programmes will only occur if the technology is deployed, hence this analysis will need to understand the following:

* 1. The path to deployment of the programmes’ technologies, expressed in suitably comparable units such as MWh of energy generated. This could be using real time data if the technology has already been fully deployed or using a model to forecast deployment scenarios if the technologies have not been fully deployed yet. The Department would expect a range of possible scenarios such as pessimistic, optimistic and best estimate paths of deployment.
  2. The barriers and enablers of the path to deployment of the programmes’ technologies and how likely these barriers and enablers are.
  3. The deployment counterfactual, setting out what similar technologies would have been deployed if the NZIP programmes had not occurred or what level of deployment would have occurred without NZIP funding.
  4. The marginal improvement that the NZIP technologies have delivered to the energy system by being deployed in comparison to the counterfactual. For example, the reduced cost of the transition to net zero or the increased speed of deployment.
  5. The additional economic benefits delivered through the deployment of the NZIP technologies. For example, employment, productivity, R&D, UK supply chain utilisation and turnover.

The contractor could use the economic impact assessments contained in the programme business cases to help understand how to approach this analysis. This could be useful as baseline data for assessing programme impact. The NZIP project KPI data from the start of the project may also be useful as baseline data. This analysis will involve the understanding of complex systems so methods such as systems mapping may be appropriate. The contractor could use the Future Energy Scenarios (FES) 2024 data[[26]](#footnote-27) as a modelling dataset for the counterfactual but creative approaches to this analysis are also welcome. The contractor could use the Energy Innovation Needs Assessments (EINAs) [[27]](#footnote-28) to support this analysis.

The Department expects the contractor to use the Department’s quality assurance model template if the contractor conducts modelling for the economic analysis[[28]](#footnote-29).

## Case studies

Case studies provide two benefits: they help the contractor gain the in-depth understanding of the innovation work that may not be provided by document reviews and research-question-focused engagement. They also provide illustration of the innovation work funded by DESNZ to the evaluation report reader. DESNZ therefore believes that case studies are an important part of the evaluation and suggest **three project case studies per programme (excluding IFP, which will require only one case study)** to be carried out.

DESNZ would like the evaluation to **also** carry out **three thematic case studies**, reviewing evidence from across a selection of cross-programme-relevant projects. The exact definition of these can still be agreed, but a suggestion would be to cover:

* Commercialisation (market engagement and scale up of the technology)
* Industry engagement (industry stakeholders attitudes and adoptions of the technology)[[29]](#footnote-30)
* Policy influence

This will equate to 22 case studies in total.

Case studies should be no more than 1-2 pages and will provide a synthesis of findings across both primary and secondary data analysis

Case studies should be constructed by drawing on the semi-structured interviews, and a review of secondary data sources such as project management information. These should represent the diversity of NZIP programmes being supported as well as seeking to represent, as far as possible, the diversity across other key project attributes (e.g., type of support needed, SME size, TRL/CRL progression level). DESNZ will support the evaluation contractor in the selection of case study projects.

DESNZ would like case study reports to be accessible and engaging for non-analytical audiences, and so are open to creative suggestions for presenting case studies.

## Proposed methods by research question

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1. Addressing technological challenge | 2. Non-technical barriers | 3. Coherent approach | 4. Fit with non-NZIP innovation prog | 5. Fit with wider policy | 6. Objectives achieved | 7. Selected NZIP processes | 8. Efficient route to outcomes and impacts | 9. Changing understanding, plans, actions | 10. Commercial success | 11. Secondary outcomes | 12. Sustainability of technologies | 13.. Next steps | 15- Programme specific questions |
| Document and evidence reviews |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Business cases | x |  | x |  |  | x | x |  | x |  | x |  |  | x |
| Project reports (applications, start & close forms, stage gate reviews, final project reports) |  |  |  |  |  | x | x |  | x |  | x |  |  | x |
| KPIs |  |  |  |  |  | x |  |  | x | x | x | x |  | x |
| MAPP data |  |  |  |  |  | x | x |  | x |  | x | x |  | x |
| Policy documents / CCC plans | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Other innovation programmes | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Alternative views on tech requirements | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Identify similar programmes outside SICE |  |  |  | x | x |  |  |  |  |  |  |  |  |  |
| Alternative programmes' documentation |  |  |  | x |  |  |  |  |  |  |  |  |  |  |
| Barriers / drivers of successful innovation programmes |  | x |  |  |  |  |  |  |  |  |  |  |  |  |
| Interviews / focus groups |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Wider industry stakeholders | x |  |  | x | x |  |  |  |  | x |  |  | x |  |
| CCC | x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Policy | x |  |  |  | x |  |  |  | x |  | x | x | x | x |
| SICE senior management |  |  |  |  |  | x | x |  |  |  |  |  | x |  |
| SICE PMO |  |  |  |  |  |  |  | x |  |  |  |  |  |  |
| SICE programme / theme leads | x | x | x |  | x | x | x | x | x | x | x | x | x | x |
| SICE monitoring officers |  |  |  |  |  | x | x | x | x |  | x | x |  | x |
| Project leads |  | x |  |  |  | x | x | x | x | x | x | x |  | x |
| Project industrial partners |  |  |  |  | x | x | x | x | x | x | x | x |  | x |
| Other funding programmes' representatives |  |  |  |  | x |  |  |  |  |  |  |  |  |  |
| Expert review process | x |  | x |  | x |  |  | x | x | x | x | x | x | x |
| Survey |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| All participating project leads / industry partners |  |  |  |  |  |  |  |  | x | x | x | x |  | x |
| Mapping / Analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Theory of change - programmes |  |  | x |  |  |  |  |  | x | x | x | x |  | x |
| Theory of change – cross-programme |  |  | x |  |  |  |  |  | x |  | x | x |  | x |
| Systems mapping |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Economic Evaluation |  |  |  |  |  |  |  | x |  | x |  |  |  | x |

## Data Sources

The following data will be made available from DESNZ:

* Business cases: each programme has a business case that sets out the strategic, economic, commercial, financial and management case for the programme.
* Competition documents: the public invitation to apply for programme funding, setting out background, project requirements and assessment criteria.
* Project applications: The full application for funding, describing the proposed technology and its advantage over current technologies or practices, project delivery costs and timescales. Commercially sensitive elements will be redacted. Applications can be made available for successful and unsuccessful applicants, although latter would require justification related to the research questions.
* Project start and close forms: a short summary of baseline, expected and final effects of the project, both qualitative and quantitative.
* Key performance indicators (KPIs): KPIs are collected at project start and annually for all projects and for three years post-closure, once available. Further detail about KPIs is included in Appendix B.
* Management application (MApp) notes: provides short programme and project descriptions, monthly notes on risks and opportunities, benefits, and regular updates on progress (including timetable changes), at project and programme level.
* Stage Gate review: projects evidence their progress during the programme and write a report or similar evidence pack to support their argument for continuing their project work.
* Final Project Reports: projects evidence their progress throughout the programme and write a report or similar evidence pack to conclude their work.

Access to the following stakeholders can be made available. Where known, the number of stakeholders in the category are noted:

* Programme leads (7): these lead individual programmes at DESNZ.
* Theme leads and deputy directors (4): lead a group of programmes at higher management and strategic level.
* Monitoring officers (7): support the delivery of projects by monitoring deliverables.
* Portfolio management office staff (3: manage MApp and review progress with programme leads.
* Project leads and partners (~150)
* Policy leads: Lead on non-innovation policies related to the programmes. Numbers depend on the scope of policies considered relevant.
* Policy professions working on related innovation policies or their DESNZ links.

# **Phases and outputs**

DESNZ expects this project to be delivered in three phases. DESNZ is seeking outputs that are short, targeted and accessible, with more detailed information provided in annexes or separate documents. Applicants are encouraged to propose alternative approaches to the ones set out below, subject to covering the required reporting time points.

|  |  |  |
| --- | --- | --- |
| **Phase** | **Activities** | **Date complete** |
| **Commissioning** | Contractor starts work | April 2025 |
| **Phase 0** | Updated evaluation plan | June 2025 |
| **Phase 1** | Early findings presentation to internal DESNZ stakeholders | November 2025 |
| **Phase 1** | Interim report | January 2026 |
| **Phase 2** | Interim findings presentation to internal DESNZ stakeholders | After first round of fieldwork for phase 2 |
| **Phase 2** | Final findings presentation | March 2028 |
| **Phase 2** | Final report | April 2028 |

## Phase 0 – Design – Final outputs in June 2025

The design phase will create an evaluation plan, expanding on the outline plan supplied as part of the bid. Activities to produce this could include: 

* A document review to support the familiarisation of the evaluation contractor with the programmes and the sector, as well as the available secondary data as outlined in the “data sources” sub-section above. Insights from this may also feed into drafting of the Evaluation Plan.
* Review of existing project monitoring reports to establish project progress to date and any implications for the Evaluation Plan and Theory of Change.
* Co-creation and production of Theories of change with the DESNZ evaluation team.
* An outline of, and rationale for, the analytical methods and evaluation methodology to be used.
* Refine evaluation questions proposed in this ITT.

## Phase 0 outputs:

* Updated Evaluation Plan
* Theories of change

## Phase 1 – Final outputs in January 2026

It is recommended that Phase 1 begins immediately after the design phase is complete. Activities will include data collection on any early outputs and current expectations about the achievement of outcomes and potential risks to this. This will be collected via:

* Stakeholder interviews
* Project Survey (if feasible within allotted time)
* Secondary sources

At this stage of reporting, DESNZ is most interested in questions 1-2, 4-7, 10, 12-13, the programme specific evaluation questions, and including the theories of change and, if relevant, the systems map. These questions are prioritised to inform internal DESNZ decisions related to any potential future Net Zero innovation programmes. However, other evaluation questions can be explored if this is appropriate within the research approach. In addition to cross-programme reporting, the report should include programme-level reporting, this could be included in the format of 1–2-page summaries in an annex.  Reporting is expected in the form of a summary report in the format 1:3:2518, with any further details in annexes. This report may be published. .

## Phase 1 outputs:

* An interim evaluation report (with specified annexes)
* Scoping note on economic analysis
* Early findings presentation to Department stakeholders in November 2025

Phase 2 – Final outputs in April 2028

This phase will seek to expand on the evidence gathered in the interim report, and answer any un-explored research questions, including efficiency, longer-term outcomes, impacts and sustainability. This will be collected via:  

* Stakeholder interviews
* Project Survey
* Secondary sources

The contractor should consider the most appropriate timings for the surveys and interviews. The department suggests that a two-phase approach to fieldwork for Phase 2 may be appropriate, consisting of:

* an initial round 18 months after programme completion (around autumn 2026). The logic for this timing is that it will allow time for intermediate outcomes to emerge (e.g. for projects to secure further investment), and because at this stage projects will be able to provide a more accurate picture of likely long-term impacts. However, leaving fieldwork entirely until later in this phase would increase the risk of low recall and response rates. The Department would like the contractor to deliver a presentation to internal DESNZ colleagues after this data collection to ensure findings continue to be disseminated in a timely manner.
* a second, later round (in around autumn 2027), focused on longer-term outcomes and impacts, to ensure data can also be collected which is up-to-date close to the point of final reporting.

The report should include programme-level reporting. This could be included in the format of 1–2-page summaries in an annex.  The report should also include economic analysis. Reporting is expected in the format 1:3:50, with any further details in annexes. This report will be published.

## Phase 2 output:

* Final impact evaluation report, including economic analysis
* Final drafts of case studies, 1-2 pages in length
* Two presentations to Department stakeholders, one after the first round of phase 2 fieldwork and one in March 2028
* Presentation to industry stakeholders at forums to be determined

## Expected outputs that should be included at each phase

* Revised theory of change and evaluation framework
* Research tools for fieldwork
* Technical report/annex- Outputs should include **anonymised/aggregated datasets** and **3-4 transcripts/detailed notes of qualitative interviews for each evaluation phase**, for the purposes of QA and further analysis.

We would welcome suggestions as to any further outputs and would expect to agree a final set of deliverables at the inception stage.

# **Evaluation delivery**

## Resources

We will make available £800,000 for the evaluation and provide 1-2 days per week support from our evaluation team.  
  
Estimated yearly split:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **2024/25** | **2025/26** | **2026/27** | **2027/28** | **Total** | **Rounded Total** |
| **Industry & Hydrogen** | £5,159 | £348,102 | £277,587 | £151,778 | £782,625 | £800,000 |

## Break clause

The contract will have break clauses between the phases. As such, we ask that the contractor provides updated evaluation plans following the end of each phase. This approach will allow for emerging evidence to be fed back into the evaluation plan and verify the value for money of the evaluation.

The break clause between phases 1 and 2 in March 2026 also exists primarily to ensure that departmental spending commitments are limited to governmental spending review periods. We would only seek to engage the clause if spending review commitments make it necessary or if the delivery of the work falls far short of expectations.

## Skills and Expertise

DESNZ require you to demonstrate that you have the expertise and capabilities to undertake the project. Your tender response should include a summary of each proposed team member’s expertise and capabilities.

The following skills and expertise are considered particularly important for this work:

* Design and delivery of large-scale (value for money and impact) evaluations;
* Design of innovation or alternative approaches to evaluation in particular working with benefits that are not easily quantified.
* Designing and undertaking the types of primary (interviews, survey, case studies) and secondary data collection and analysis outlined in the specification;
* Designing and undertaking theory of change development;
* Ability to deliver robust and high-quality analytical work to deadlines using appropriate project management techniques;
* Delivery of high-quality analysis, synthesis, reporting and communication of complex programme evaluation;
* Design and delivery of economic impact evaluation methods and modelling;
* Understanding of the UK energy and climate change policy landscape, including knowledge specifically of relevant technologies, markets and industry.

Bidders should propose named members of the project team and include the tasks and responsibilities of each team member. This should be clearly linked to the work programme, indicating the grade/ seniority of staff and number of days allocated to specific tasks.

Suppliers should identify the individual(s) who will be responsible for managing the project.

## Working Arrangements

The successful contractor will be expected to identify one named point of contract through whom all enquiries can be filtered. A DESNZ project manager will be assigned to the project and will be the central point of contact. Where a consortium or sub-contractors are in place, DESNZ expect that they are included in relevant meetings, workshops, and review points to ensure their full engagement in the project. All contractors and sub-contractors are responsible for the delivery of outputs to the appropriate time and quality. It is expected that the lead contractor takes an active role in oversight of all workstreams and bears the overall responsibility for the delivery of the evaluation activities and outputs.

Bidders should assume that DESNZ take an active role in review and quality assurance of research materials, analysis, and outputs, beyond external peer review. It should be expected that reports, research materials and outputs go through at least four iterations (i.e., three rounds of comments from DESNZ), dependent on the complexity of the product. It is expected that all outputs are drafted to a very high standard, including early versions. Additional amendments may be required for published outputs. Throughout the research, DESNZ will be required to review and sign off all final data collection instruments, analytical approaches (including key assumptions) and outputs.

We envisage the need for close interaction between the DESNZ Project Manager and contractor throughout the process, to ensure that emerging issues are dealt with promptly and that DESNZ fully understand the assumptions and approach taken. Bidders should assume that the supplier will **meet with departmental evaluation leads fortnightly** during delivery of each phase and provide a short-written update on alternative weeks. In important delivery periods, such as project set up, weekly meetings may be necessary. Bidders should also assume that engagement with DESNZ will include steering group meetings (frequency to be confirmed), and face to face meetings as required to design, and deliver the chosen methods.

## Quality assurance

Bidders must set out their approach to quality assurance (QA) in their response to this specification with a QA plan. We expect the successful supplier to carry out suitable quality assurance of their work before submitting it to the department, as set out in their bid.

Sign-off for quality assurance must be conducted by someone of sufficient seniority within the contractor organisation to be able to take responsibility for the work done. To demonstrate an effective process to produce high quality reporting, the contactor/s must ensure that quality assurance is done by individuals who were not directly involved in that research or analysis. Where complex or innovative methods are proposed, bidders should specify how additional quality assurance will be provided. Where necessary, this should include the use of external experts.

The successful bidder will be responsible for any work supplied by sub-contractors. For primary research, contractors should be willing to facilitate DESNZ research staff to attend interviews or listen in to telephone interviews as part of the quality assurance process.

DESNZ reserves the right to refuse to sign off outputs which do not meet the required standard specified in this invitation to tender and/or the contractor’s QA plan. QA should cover all aspects of the project undertaken by the contractors, including data collection, data analysis and reporting.

Bidders should note that DESNZ may appoint its own peer reviewer(s) to QA publishable outputs. Consideration should be given to how the external peer reviewer(s) will be included in the QA process. A DESNZ appointed peer reviewer will not be expected to provide detailed quality assurance, their role will be focused on higher level peer review.

Outputs will be subject to DESNZ internal approvals, the more substantive the output the longer the approval time required. Reports, research materials and outputs will require three departmental review rounds with comments, lasting around two weeks (excluding revisions), which should be factored into the timelines.

Other useful sources of guidance and advice that will help bids and the resulting work be of the highest quality include:

* The Government Social Research Code, in particular those that relate to GSR Products:
* UK Statistics Authority Code of Practice or an equivalent standard.
* Supplementary Guidance on the Quality in Policy Impact Research
* Quality in Qualitative Research: A Framework for assessing research evidence provides a framework for appraising the quality of qualitative research.

## Data Security

The successful supplier must comply with the UK General Data Protection Regulation (UK GDPR) and any information collected, processed, and transferred on behalf of the Department, and in particular personal information, must be held and transferred securely. Bidders must provide assurances of compliance with GDPR and set out in their proposals details of the practices and systems they have in place for handling data securely including the transmission between the field and head office and then to the Department. The successful supplier will have responsibility for ensuring that they and any subcontractor who processes or handles information on behalf of the Department is conducted securely. The sorts of issues which must be addressed satisfactorily and described in contractor’s submissions include:

* procedures for storing both physical and system data;
* data back-up procedures;
* procedures for the destruction of physical and system data;
* how data is protected;
* data encryption software used;
* use of laptops and electronic removable media;
* details of person(s) responsible for data security;
* policies for unauthorised staff access or misuse of confidential/personal data
* policies for staff awareness and training of DPA;
* physical security of premises; and
* how research respondents will be made aware of all potential uses of their data

## Ethics

All applicants will need to identify and propose arrangements for the initial scrutiny and on-going monitoring of ethical issues. The appropriate handling of ethical issues is part of the tender assessment exercise and proposals will be evaluated on this as part of the ‘consideration of challenges’ criterion.

We expect contractors to adhere to the following Government Social Research (GSR) Principles:

* Clear and defined public benefit
* Sound application, conduct and interpretation
* Data protection regulations
* Specific and informed consent
* Enabling participation
* Minimising personal and social harm

1. [Industrial Fuel Switching Competition Phase 2: demonstration projects (closed to applications) - GOV.UK](https://www.gov.uk/government/publications/industrial-fuel-switching-competition-phase-2-demonstration-projects#:~:text=The%20Industrial%20Fuel%20Switching%20(%20IFS%20)%20Competition%20of%20up%20to%20%C2%A3,through%20the%202020s%20and%202030s.) [↑](#footnote-ref-2)
2. [[Withdrawn] Red Diesel Replacement competition: phase 2 (closed to applications) - GOV.UK](https://www.gov.uk/government/publications/red-diesel-replacement-competition-phase-2) [↑](#footnote-ref-3)
3. [Green Distilleries Competition (closed to applications) - GOV.UK](https://www.gov.uk/government/publications/green-distilleries-competition) [↑](#footnote-ref-4)
4. [Industrial Energy Efficiency Accelerator (IEEA): successful projects - GOV.UK](https://www.gov.uk/government/publications/industrial-energy-efficiency-accelerator-ieea) [↑](#footnote-ref-5)
5. [Findings of the Industry of Future Programme - GOV.UK](https://www.gov.uk/government/publications/findings-of-the-industry-of-future-programme) [↑](#footnote-ref-6)
6. [[Withdrawn] Industrial Hydrogen Accelerator Programme (competition closed) - GOV.UK](https://www.gov.uk/government/publications/industrial-hydrogen-accelerator-programme) [↑](#footnote-ref-7)
7. [[Withdrawn] Low Carbon Hydrogen Supply 2 Competition (closed) - GOV.UK](https://www.gov.uk/government/publications/low-carbon-hydrogen-supply-2-competition) [↑](#footnote-ref-8)
8. https://www.gov.uk/government/collections/net-zero-innovation-portfolio [↑](#footnote-ref-9)
9. https://www.gov.uk/government/publications/net-zero-strategy [↑](#footnote-ref-10)
10. https://www.gov.uk/government/publications/industrial-decarbonisation-strategy [↑](#footnote-ref-11)
11. https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy/ [↑](#footnote-ref-12)
12. OECD (2021), *Applying Evaluation Criteria Thoughtfully*, OECD Publishing, Paris, <https://doi.org/10.1787/543e84ed-en>. [↑](#footnote-ref-13)
13. https://assets.publishing.service.gov.uk/media/6051cd04e90e07527f645f1e/Industrial\_Decarbonisation\_Strategy\_March\_2021.pdf [↑](#footnote-ref-14)
14. https://www.gov.uk/government/publications/net-zero-strategy [↑](#footnote-ref-15)
15. https://assets.publishing.service.gov.uk/media/6051cd04e90e07527f645f1e/Industrial\_Decarbonisation\_Strategy\_March\_2021.pdf [↑](#footnote-ref-16)
16. https://assets.publishing.service.gov.uk/media/64c7e8bad8b1a70011b05e38/UK-Hydrogen-Strategy\_web.pdf [↑](#footnote-ref-17)
17. https://assets.publishing.service.gov.uk/media/64c7e8bad8b1a70011b05e38/UK-Hydrogen-Strategy\_web.pdf [↑](#footnote-ref-18)
18. https://assets.publishing.service.gov.uk/media/646f13627dd6e70012a9b34c/nzip-anf-progress-report-2021-22.pdf [↑](#footnote-ref-19)
19. https://assets.publishing.service.gov.uk/media/646f13627dd6e70012a9b34c/nzip-anf-progress-report-2021-22.pdf [↑](#footnote-ref-20)
20. See https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm [↑](#footnote-ref-21)
21. https://www.gov.uk/government/publications/industrial-decarbonisation-strategy, particularly Annex 4. [↑](#footnote-ref-22)
22. <https://www.gov.uk/government/publications/uk-hydrogen-strategy,> [↑](#footnote-ref-23)
23. https://www.gov.uk/government/publications/the-magenta-book  [↑](#footnote-ref-24)
24. Numbers are approximate and may vary slightly [↑](#footnote-ref-25)
25. https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020  [↑](#footnote-ref-26)
26. https://www.neso.energy/publications/future-energy-scenarios-fes#:~:text=FES%202024%3A%20Executive%20introduction&text=This%20means%20we%20must%20prioritise,the%20challenge%20of%20our%20generation.  [↑](#footnote-ref-27)
27. <https://www.gov.uk/government/publications/energy-innovation-needs-assessments>. Updated EINAs for 2025 are expected to be published in time for inclusion in scoping of this evaluation.  [↑](#footnote-ref-28)
28. https://www.gov.uk/government/publications/energy-security-and-net-zero-modelling-quality-assurance-qa-tools-and-guidance [↑](#footnote-ref-29)
29. There is a conceptual distinction between ‘technology developers’ which are the companies that the Department funds and industry who are potential customers to the technologies. However, often the technology developers and industry stakeholders are the same. [↑](#footnote-ref-30)