Department for
Business, Energy
& Industrial Strategy

The Net Zero Hydrogen Fund

Government response to consultation

April 2022

Any enquiries regarding this publication should be sent to us at:
hydrogenproduction@beis.gov.uk

Contents

1. General Information

1.1 Background

The Prime Minister's *Ten Point Plan for a Green Industrial Revolution*[1] committed to focus on driving innovation, boosting export opportunities, and generating green jobs and growth across the country to level up regions of the UK. To build on this, government published the Net Zero Strategy[2] in October 2021, setting out a long-term plan to deliver our legally binding targets under the Climate Change Act. Both documents pointed to the role of low carbon hydrogen in meeting our emission reduction targets while generating economic growth in the UK.

The Ten Point Plan included an ambition for 5GW of low carbon hydrogen production capacity in the UK by 2030 and in August 2021 the Government published the UK Hydrogen Strategy, outlining a comprehensive roadmap for the development of the hydrogen economy to deliver this ambition. However, with an increased focus on energy independence as set out in the Energy Security Strategy, we have now doubled our UK ambition to up to 10GW of low carbon hydrogen production capacity by 2030, subject to affordability and value for money, with at least half of this being from electrolytic hydrogen, drawing on the scale up of the UK's renewables and new nuclear capacity.

The Net Zero Hydrogen Fund (NZHF), announced in the Ten Point Plan, is worth up to £240 million and will be delivered between 2022 and 2025. The NZHF is one of a range of government interventions intended to support the commercial deployment of low carbon hydrogen projects during the 2020s. These measures, including capital grants from the NZHF, aim to ensure the UK has a diverse and secure decarbonised energy system. It will also support our ambition for up to 10GW of low carbon hydrogen production capacity by 2030. The NZHF has been designed to support all forms of hydrogen production, including from nuclear energy, provided projects meet eligibility requirements.

From August to October 2021, the government sought views on the proposed policy design framework for the NZHF, specifically on the types of activities the Fund should seek to support. This document summarises the 106 responses received from a wide variety of stakeholders during the consultation on 'Designing the Net Zero Hydrogen Fund'. For each question asked in the consultation, this document presents the qualitative and quantitative analysis of the responses received and

[1] The Ten Point Plan for a Green Industrial Revolution: https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution
[2] The Net Zero Strategy: https://www.gov.uk/government/publications/net-zero-strategy

demonstrates how feedback has been incorporated into the final scheme design of NZHF.

We are publishing this response to the NZHF consultation alongside several other documents:

- **Low Carbon Hydrogen Business Model (HBM) government response**[3]: this sets out the proposed policy and current thinking on the different aspects of the HBM. The HBM aims to overcome the cost gap between low carbon hydrogen and higher carbon counterfactual fuels, supporting multiple hydrogen production routes to enable us to rapidly develop low carbon hydrogen production at scale.
- **Indicative Heads of Terms for the hydrogen business model**[4]: this sets out a preliminary and indicative framework for the principal terms and conditions that are expected to be included in the contract underpinning the hydrogen business model – the Low Carbon Hydrogen Agreement (LCHA).
- **The UK Low Carbon Hydrogen Standard (LCHS) government response**[5]: this sets out an emissions standard to underpin the deployment of low carbon hydrogen for use across the economy. One of the objectives of the standard is to ensure that hydrogen projects supported by government are aligned with our net zero ambitions.
- **The UK Low Carbon Hydrogen Standard guidance document**[6]: this sets out in detail the methodology for calculating the emissions associated with hydrogen production and the steps producers are expected to take to prove that the hydrogen they produce is compliant with the standard. The document will also set out sustainability criteria that biomass hydrogen producers will need to meet and how to put a risk mitigation plan in place for fugitive hydrogen emissions in production. Further detail on the criteria for specific hydrogen production pathways can be found in Annexes A – E. The guidance document should be used by hydrogen producers seeking support from any government schemes and policies that apply the standard.

[3] The Low Carbon Hydrogen Business Model Government Response: https://www.gov.uk/government/publications/business-models-for-low-carbon-hydrogen-production
[4] The indicative heads of terms for the hydrogen business model: https://www.gov.uk/government/publications/business-models-for-low-carbon-hydrogen-production
[5] The UK Low Carbon Hydrogen Standard government response: https://www.gov.uk/government/consultations/designing-a-uk-low-carbon-hydrogen-standard
[6] The UK Low Carbon Hydrogen Standard guidance document: https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria

- **Electrolytic Allocation Market Engagement document**[7]: this seeks views on a proposed approach to a joint allocation window for the HBM and NZHF capital support to electrolytic hydrogen projects.
- **The Hydrogen Investor Roadmap**[8]: The Roadmap showcases the UK's hydrogen offer and the scale of our ambition for the role of the hydrogen economy in meeting Net Zero. It spotlights the exciting investment opportunities across the hydrogen value chain – from production, through transmission and storage to the range of potential end uses, including power, transport and heating.

On 19 April 2022, UKRI (the Fund's delivery partner for the first round of funding) will also be publishing the following:

The Net Zero Hydrogen Fund competition brief documents: these will outline the assessment process for the first NZHF funding wave and will detail our eligibility and assessment criteria and what we will require from applicants.

1.2 Enquiries to the NZHF

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Email: hydrogenproduction@beis.gov.uk

Territorial extent: UK wide

[7] The Electrolytic Market Engagement document: https://www.gov.uk/government/consultations/hydrogen-business-model-and-net-zero-hydrogen-fund-market-engagement-on-electrolytic-allocation
[8] The Hydrogen Investor Roadmap: https://www.gov.uk/government/publications/hydrogen-investor-roadmap-leading-the-way-to-net-zero

2. Executive summary

This document responds to the 106 responses received to the consultation on 'Designing the Net Zero Hydrogen Fund'[9], which ran from 17 August 2021 to 25 October 2021.

We are grateful for all the feedback we have received on the consultation, both in response to the document and our stakeholder engagement events during the consultation period, which included 29 bilateral meetings, 8 virtual roundtables and trade body events, as well as a livestream event with 288 attendees.

Following analysis of stakeholder feedback and consultation responses, we are proposing to split the NZHF's grant allocation into the following four strands:

- **Strand 1:** DEVEX[10] (development expenditure) for Front End Engineering Design (FEED) studies and post FEED costs.
- **Strand 2:** CAPEX (capital expenditure) for projects that do not require revenue support through the hydrogen business model.
- **Strand 3:** CAPEX for non-Carbon Capture, Usage and Storage (CCUS) enabled projects that also require revenue support through the hydrogen specific business model.
- **Strand 4:** CAPEX for CCUS-enabled projects that require revenue support through the hydrogen business model.

This Government response will focus on how we have incorporated this feedback into the final scheme design for strands 1 and 2, along with an overview of our approach to strands 3 and 4. For strand 3, a market engagement exercise, which sets out our proposed approach to a joint HBM and NZHF allocation process for non-CCUS enabled hydrogen projects, is being published alongside this document. This includes the proposal that the first allocation round for strand 3, opening in 2022, is limited to electrolytic projects only. For strand 4, we plan to run an Expression of Interest (EOI) stage in summer 2022 for projects shortlisted through the Phase-2 Cluster Sequencing process.

The budget for strands 1 and 2 is up to £90m. As the NZHF is primarily a deployment Fund, we expect a significant proportion of this budget to be allocated to strand 2 projects.

[9] The Net Zero Hydrogen Fund consultation: https://www.gov.uk/government/consultations/designing-the-net-zero-hydrogen-fund

[10] Development funding will still be in the form of capital support, therefore eligible costs must be capitalised.

We aim to open the first funding window for strands 1 and 2 in April 2022, with the plan of a further funding window in 2023/24. The funding for strand 1 must be spent by Q1 2024 (first wave only) and for strand 2 by Q1 2025, we therefore encourage applicants with large projects, or those with lengthy deployment timelines, to apply as early as possible to fit within these time frames.

We intend to allocate the remainder of NZHF funds to strands 3 and 4. We anticipate strand 3 opening in late June/ early July 2022, after the market engagement exercise on the design of the allocation round has completed.

Our anticipated budgets for the strands remain flexible and we reserve the right to change course from our initial expected budget allocations, as the Fund evolves over its lifetime. For example, this could mean flexing strand budgets based on new or revised project pipeline information to maximise the impact of the NZHF during the 2022-25 funding period. We anticipate further funding being available beyond 2025 to bring the total quantum of capital funding to £500m between 2022-2030. We also reserve the right to alter the above indicative timelines at any stage in the process.

2.1 Design of Strands 1 & 2

Our analysis of stakeholder feedback shows broad agreement with many aspects of the proposed policy design framework, including the primary focus on using capital grants to de-risk projects and unlock private capital, targeted development support to stimulate the project pipeline, and a phased approach to get funding to projects as quickly as possible. Based on stakeholder feedback and further policy development work, we have made some modifications to the Fund's design to maximise its impact. These are summarised below as well as being covered in detail in section 7.

In summary, the key design features for strands 1 and 2 for the NZHF are as follows:

- We are aiming to deliver the funding in the form of grants, co-funded with private sector funding.
- Hydrogen production projects will be able to apply for co-funding through strand 1 if they require support with DEVEX costs for FEED and post-FEED costs. Where appropriate, support will also be available for FEED and post-FEED costs for associated on-site transport and storage (T&S) infrastructure.
- Projects applying to strand 1 will be able to bid up to 50% of their total eligible costs and applicants will be expected to evidence that their bid represents the minimum funding necessary for FEED and post-FEED activities.
- Capital co-funding will be available through strand 2 for hydrogen production projects that do not require the HBM to take a final investment decision (FID).

Funding will be available for costs associated with core hydrogen production facilities. Strand 2 will support multiple hydrogen production technologies.

- Projects applying to strand 2 will be able to bid up to 30% of their total eligible costs and applicants will be expected to evidence that their bid represents the minimum funding necessary for their project to take FID and begin construction.
- Eligibility criteria will ensure projects:
    - Produce new low carbon hydrogen as defined by the LCHS.
    - Are based in the UK.
    - Use a core technology that has a Technology readiness level (TRL) of 7 or above.
    - Have at least one agreed offtaker for strand 2 (CAPEX) or demonstrated demand for hydrogen for strand 1 (DEVEX).
    - Are able to demonstrate they have the required private sector financial backing and can begin FEED (strand 1) or take FID (strand 2) within the required time frame.
- Projects applying for strands 1 and 2 will be assessed against seven criteria:
    - Deliverability
    - Risk
    - Project governance and stakeholder management
    - Emissions and wider environmental impacts
    - Commercial
    - Economic benefits and project significance
    - Hydrogen market development and knowledge sharing
- We intend for the NZHF to be funded and delivered on a UK-wide basis. We note the Scottish Government's intention that any funding available from the Emerging Energy Technologies Fund for hydrogen production will be complementary to the NZHF, rather than duplicative of it.
- Any decision to award funding will be subject to the application of portfolio design criteria, subsidy control requirements, any balance sheet implications, the status of any relevant statutory consents and the project represents value for money for the consumer. If any awards are in scope of Article 10 of the Northern Ireland Protocol, EU state aid rules apply.

2.2 Next Steps

The competition brief documents for strand 1 and 2 will be published on 19 April 2022**.** The first wave of funding for strands 1 and 2 will open on 25 April 2022. The application window for Strand 1 will close on 22 June and strand 2 will close on 6 July 2022.

The market engagement exercise, which sets out further details and seeks further input on strand 3, is being published alongside this document and will be open for 4 weeks. We intend to open the first joint NZHF/HBM (strand 3) window in late June/ early July 2022.

We intend for CCUS-enabled projects applying for a hydrogen business model through Phase-2 of the CCUS cluster sequencing process to have the opportunity to apply for NZHF capital co-funding (strand 4). We plan to launch a strand 4 NZHF EOI process following the announcement of the Phase-2 shortlisted projects, followed by a strand 4 application process in 2023.

Table 1: Opening and closing dates for NZHF strands with details on where to find further information

Strand	Opening date	Closing date	Further information
1 - DEVEX	25 April 2022	22 June 2022	See NZHF Strands 1 & 2 competition brief documents which are being published on 19 April 2022
2 – CAPEX without HBM	25 April 2022	6 July 2022	
3 – CAPEX with HBM	Late June / early July 2022	To be confirmed	See Hydrogen business model and Net Zero Hydrogen Fund: Market Engagement on Electrolytic Allocation

4 – CAPEX	EOI: Summer 2022 Full application: 2023	To be confirmed	An EOI form will be sent to shortlisted P2-projects in summer 2023.

3. Consultation exercise

3.1 About the consultation

The NZHF consultation sought views on the proposed policy design framework of the NZHF. The consultation was published by BEIS on 17 August 2021 and ran for a period of ten weeks, closing on 25 October 2021.

In the consultation, we were particularly interested in understanding stakeholder views on the following design features:

- Who can apply to the NZHF?
- What type of funding should the NZHF offer?
- What technologies should the NZHF support?
- What activities should the NZHF support?
- How should the NZHF be delivered?

We would like to thank all stakeholders who attended our virtual workshop events and bilateral meetings, as well as those who contributed views via CitizenSpace, a digital platform used to host consultations on the GOV.UK website, or via email.

The Devolved Administrations have been engaged throughout the development of the Fund.

3.2 About the government response

This document will outline our response to each question we asked in the consultation, providing a summary of the responses received and the UK government's response. The questions were designed to allow for a quantitative and qualitative analysis of responses, and both have been included in this response.

The overall response has shaped the design of the first wave of funding for Strands 1 and 2, worth up to £90 million. Applications for the first wave of funding will open on 25 April 2022.

Further information regarding Strand 3 will be available via the HBM and NZHF: Market Engagement exercise on Electrolytic Allocation.

For strand 4, we plan to send an EOI form to shortlisted Phase-2 projects in summer 2022.

4. Conducting the consultation exercise

During the ten-week consultation period, 8 virtual roundtable meetings, 29 bilateral meetings, and a Teams live event were held. The events were well received by those who attended and valuable input was collected and considered after the events. The Devolved Administrations promoted our engagement events through their respective networks and were regularly updated on our consultation exercise.

Formal responses to the consultation were received via Citizen Space or email.

4.1 Overall approach to questions

The consultation consisted of 16 questions[11].

Questions often had an initial closed (yes/no) element followed by the opportunity to expand upon that answer. For example:

1. Do you agree with the proposal that xxxx? (Y/ N)
2. Please expand on your answer and give evidence where possible

A few questions were either partly or entirely open ended and allowed respondents to expand on their answer.

In our response to each question, we respond to the feedback, outline our intent, and offer further justification or an explanation of the policies where necessary.

4.2 Presentation of the analysis

Throughout the document, we refer to the 106 companies/organisations/individuals who answered questions in the consultation as respondents. A summary of the analysis of the responses is provided for each question and further information can be found in the thematic tables presented in **Annex A**.

We have used graphs/charts to present the analysis and have indicated whether the feedback supported our proposed policy positions.

In the graphs/charts, we have plotted the number of responses along the x-axis, with both the number of respondents and percentages provided in the narrative text. For

[11] See Annex C for full list of consultation questions.

questions which received free form answers, we often identified multiple themes within a single response. As such the figures attributed to each theme add up to more than the number of respondents. Therefore, for these questions, we have calculated percentages as the number of respondents eliciting that theme, out of the total number of respondents.

A number of the responses received by email were entirely free form and the ‘yes/no’ aspect of their answer has been inferred where possible. Where this was not possible for a specific question, we have placed them under ‘other’.

9 of the 106 responses came in the form of statements rather than as responses to specific questions in the consultation. We have included a summary of the themes in these responses in **Annex B**.

4.3 Consultation responses

The consultation received 106 responses in total. Of the 106 respondents, 57 were from organisations directly involved in a planned hydrogen production project and 49 were from other organisations including trade associations, local government, academics, consulting firms, and non-governmental organisations.

5. Scope of the government response

We considered the responses to the consultation, as well as the outputs of wider stakeholder engagement, and this has informed our decision to split the NZHF into strands. We believe this approach will best cater to the varying needs and deployment trajectories of projects, delivering support to projects as quickly as possible while also maximising alignment with the HBM. The table below lists out the scope of each strand, as well as covering the next steps for each and signposting where further information can be found. This government response sets out the final design framework for strands 1 and 2, along with an overview of our approach to strands 3 and 4.

Table 2: Overview of the NZHF funding strands, including scope and next steps.

	Scope	Next Steps	Further information
Strand 1	Projects seeking DEVEX support for FEED and post-FEED costs for hydrogen production facilities and associated on-site T&S	First funding wave opens on 25 April 2022 and closes on 22 June 2022	To follow in NZHF strands 1 & 2 Competition brief documents
Strand 2	Projects seeking CAPEX only	First funding wave opens on 25 April 2022 and closes on 6 July 2022	To follow in NZHF strands 1 & 2 competition brief documents
Strand 3	CAPEX for projects that also require a HBM	We will be seeking industry feedback on the proposed design of the first strand 3 window via a Market Engagement Exercise, published alongside this document. This exercise will run for 4 weeks, until mid-May.	See Hydrogen business model and Net Zero Hydrogen Fund: Market Engagement on Electrolytic Allocation

		We intend to open first joint NZHF/HBM window in late June/ early July 2022	
Strand 4	CAPEX for CCUS-enabled projects that also require a HBM	We intend for projects shortlisted through the Phase-2 Cluster Sequencing process, which closed for applications on 21 January 2022, to be invited to submit an EOI for NZHF funding in summer 2022.	An EOI form will be sent to shortlisted P2-projects in summer 2022.

Strand 1

Hydrogen production projects will be able to apply for co-funding through strand 1 if they require DEVEX support for the cost of FEED and post-FEED expenditures. Where appropriate, support will also be available for FEED and post-FEED costs for associated on-site T&S infrastructure. Further information on the eligibility and assessment criteria is outlined in the sections below, with full details to follow in the strand 1 competition brief document. The first funding wave for strand 1 will open on 25 April 2022.

Strand 2

Capital co-funding will be available through strand 2 for hydrogen production projects that do not require the HBM to take FID. Funding will be available for costs associated with core hydrogen production facilities. Further information on the eligibility and assessment criteria is outlined in the sections below, with full details to follow in the strand 2 competition brief document. The first funding wave for strand 1 will open on 25 April 2022.

Strand 3

For non-CCUS enabled projects that require HBM support, NZHF capital co-funding will be made available through strand 3. We anticipate the first allocation round for strand 3 will open in late June/ early July 2022 and be for electrolytic projects only. Feedback gathered via the consultation responses and stakeholder engagement sessions has indicated that a significant number of electrolytic projects wish to apply for both capital support from the NZHF and revenue support via the HBM. Further

information and the opportunity to provide comments on proposed strand 3 criteria is available in the ME exercise document[12].

Strand 4

We intend for CCUS-enabled projects applying for a hydrogen business model through Phase-2 of the CCUS cluster sequencing process to have the opportunity to apply for NZHF capital co-funding. We plan to launch a strand 4 NZHF EOI process following the announcement of the Phase-2 shortlisted projects, followed by a strand 4 application process in 2023.

6. What we were consulting on

The table below shows an overview of the key NZHF design features proposed in the consultation and how feedback has been incorporated into the final design for strands 1 and 2. Further detail on analysis and final design proposals are included our responses to each of the questions.

Table 3: Summary of scheme design positions for strands 1 & 2

Scheme Design Question	Consultation design proposal	Final Design for strands 1 and 2
What technologies should the Fund support?	Multiple hydrogen production technologies that can realistically begin production during the 2020s.	Multiple hydrogen production technologies that can realistically begin production during the 2020s.
What type of funding support should we offer?	Competitive grant co-funding is offered to eligible applicants for investment within subsidy control requirements.	Competitive grant co-funding is offered to eligible applicants for investment within subsidy control requirements. For strand 1, projects could receive up to 50% of their total eligible costs.

[12] The Electrolytic Market Engagement Exercise: https://www.gov.uk/government/consultations/hydrogen-business-model-and-net-zero-hydrogen-fund-market-engagement-on-electrolytic-allocation

		For strand 2, projects could receive up to 30% of their total eligible costs. The eligible costs will be detailed in the competition brief.
What type of activities should be covered by the Fund?	Capital co-funding for the build of new low carbon hydrogen production facilities, which includes: • Projects that will also require revenue support via a HBM; and • Projects that will not require revenue support via a HBM. • Development costs for feasibility and FEED studies, as well as post-FEED costs.	The Fund will be split into 4 strands with separate application windows: **Strand 1**: DEVEX for time limited FEED studies for core production facilities and associated on-site T&S, as well as post-FEED costs. **Strand 2**: CAPEX for projects that do not require a hydrogen specific business model. **Strand 3**: CAPEX for non-CCUS enabled projects that require revenue support via the hydrogen business model. **Strand 4:** CAPEX for CCUS-enabled projects that require revenue support via the hydrogen business model.

Eligibility and project assessment criteria	Core eligibility criteria will ensure: • Projects are intending to produce new low carbon hydrogen, as defined by LCHS • Projects are based in the UK. • Projects are using hydrogen production routes that have a technology readiness level (TRL) of 7 or above. • Projects have the required private sector financial backing and are able to take FID within the required timeframe.	Core eligibility criteria will ensure: • Projects are producing new low carbon hydrogen, as defined by the LCHS. • Projects are based in the UK and lead by a business registered in the UK. • Projects are using hydrogen production routes that have a technology readiness level (TRL) of 7 or above. • Projects have the required private sector financial backing and are able to take FID within the required timeframe.

	DEVEX eligibility • Projects are able to demonstrate demand for hydrogen. • No minimum thresholds.	**Strand 1 eligibility** • Projects are able to demonstrate demand for hydrogen. • Projects must complete all co-funded activities by Q1 2024 (first wave of funding only). • Minimum award threshold of £80,000 and maximum award threshold of £15m.
	CAPEX eligibility • Projects are able to prove they have an agreement in principle with an offtaker for some or all production volumes lined up, and that they are ready to accept hydrogen by the projects target Commercial Operation Date. • No minimum award thresholds.	**Strand 2 eligibility** • Projects are able to prove they have an agreement in principle with an offtaker for some or all production volumes lined up, and that they are ready to accept hydrogen by the projects target Commercial Operation Date. • Projects must complete all co-funded activities by Q1 2025. • Minimum award threshold of £200,000 and maximum award threshold of £30m.

	Assessment criteria to select which projects the NZHF should support and ensure the funding is aligned with the NZHF objectives and wider government strategic objectives: • Deliverability and risk • Economic benefits • Market development and learnings • Scalability and replicability • Costs • Emissions reduction	Assessment criteria to select which projects the NZHF should support and ensure the funding is aligned with the NZHF objectives and wider government strategic objectives: • Deliverability • Risk • Project governance and stakeholder management • Economic benefits and project significance • Hydrogen market development and knowledge sharing • Commercial • Emissions and wider environmental impacts
The delivery of the Fund	A flexible approach to support the range of projects across the NZHF lifespan.	The first wave of funding for strands 1 and 2 will commence on 25 April 2022. Strand 1 closes on 22 June 2022, and Strand 2 closes on 6 July 2022.

7. Government response

7.1 Rationale for the NZHF

Consultation question:

1. What wider benefits could the NZHF deliver, such as local growth and low carbon leadership opportunities?

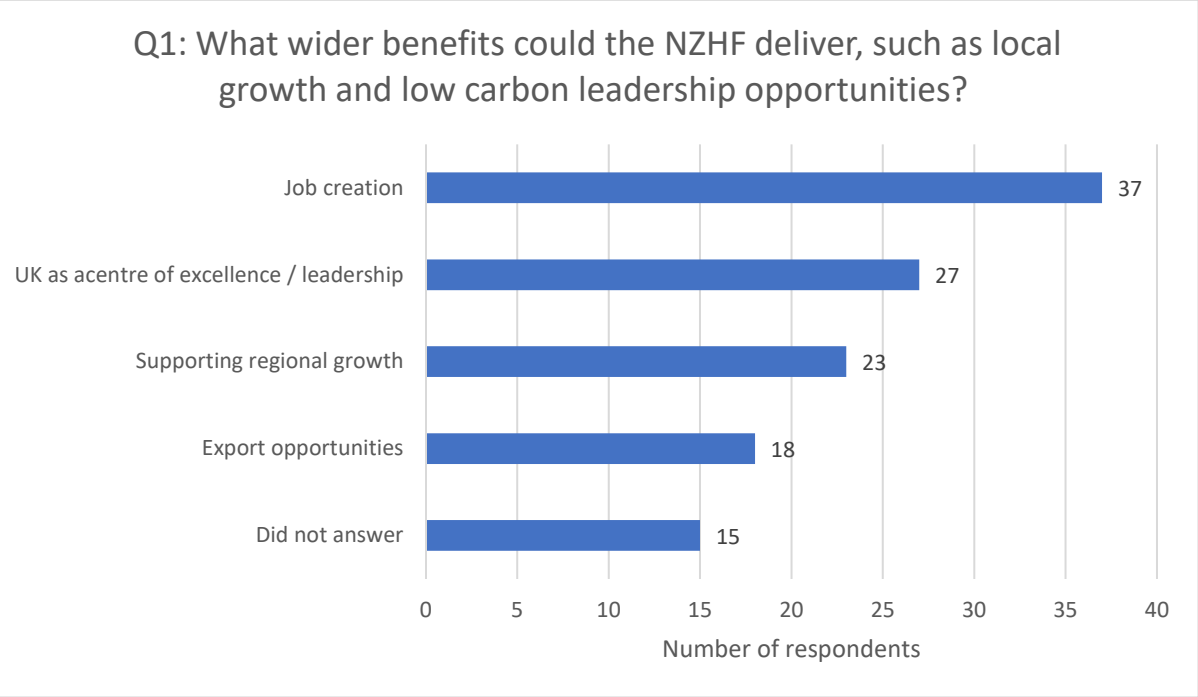

Figure 1: Summary of responses to question 1

Summary of responses

91 respondents answered question 1. Of those who answered, the most commonly identified benefit was the creation of new highly skilled jobs (41% - 37 Respondents). The other commonly identified benefits were establishing the UK as an international centre of excellence / global leadership (30% - 27 Respondents), supporting regional growth and local communities (25% - 23 Respondents), and the opportunity for export (20% - 18 Respondents). **(Full theme table can be found in Annex A).**

Our response

The NZHF's aim is to support the commercial deployment of new low carbon hydrogen production, ensuring the UK has a diverse and secure decarbonised energy system fit for meeting our net zero commitments. However, it also aims to provide several wider benefits, including direct carbon savings enabled by the low

carbon hydrogen produced by the facilities it supports, as well as additional jobs directly created through these facilities. More broadly, the Fund aims to help the market deliver learnings in the 2020s that will support future growth of hydrogen production in the UK. Through all of this, the NZHF will contribute to UK Government's levelling up vision by supporting the transition to new, high-skilled green jobs and clean economic growth across the UK. In addition, the Fund aims to support projects which are scalable and replicable, multiplying their potential to support regional growth, local communities and increase export opportunities through early-mover advantage.

The NZHF is a production focused fund and will help in developing the hydrogen economy as part of our wider Hydrogen Strategy[13]. This includes existing and developing policies to drive the development of hydrogen demand, storage, transport and networks, including measures to support research, innovation and commercialisation of hydrogen technologies across a wide range of uses.

7.2 NZHF Objectives and Scope

Consultation questions:

2. Do you agree with the proposed scope for the NZHF?

3. Are there any technologies for low carbon hydrogen production, other than CCUS-enabled and electrolytic hydrogen, that you think could begin production of low carbon hydrogen during the early 2020s? Please give details.

The consultation proposed that the NZHF should provide CAPEX co-funding for the build of new low carbon hydrogen production facilities. The consultation also sought views on the NZHF supporting DEVEX costs for feasibility and FEED studies, with possible support for post-FEED studies. The consultation proposed that the Fund should support multiple hydrogen technologies, including the main types of production (CCUS-enabled hydrogen, and electrolytic hydrogen).

[13] The UK Hydrogen Strategy: https://www.gov.uk/government/publications/uk-hydrogen-strategy

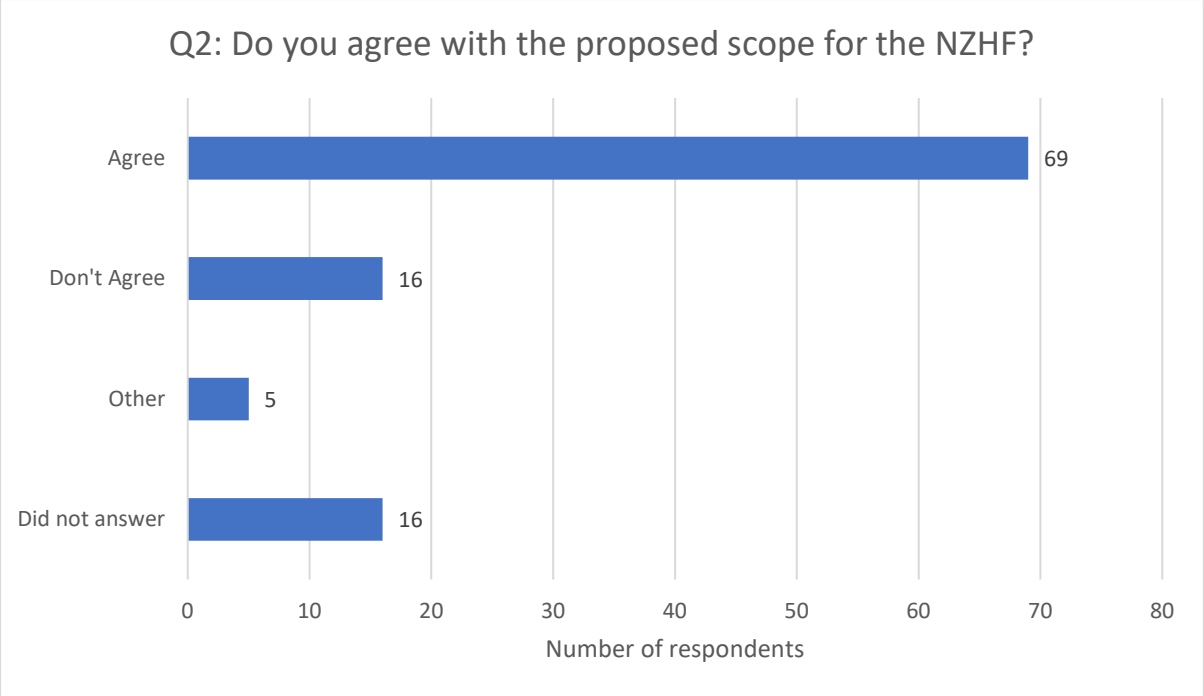

Figure 2: Summary of responses to question 2

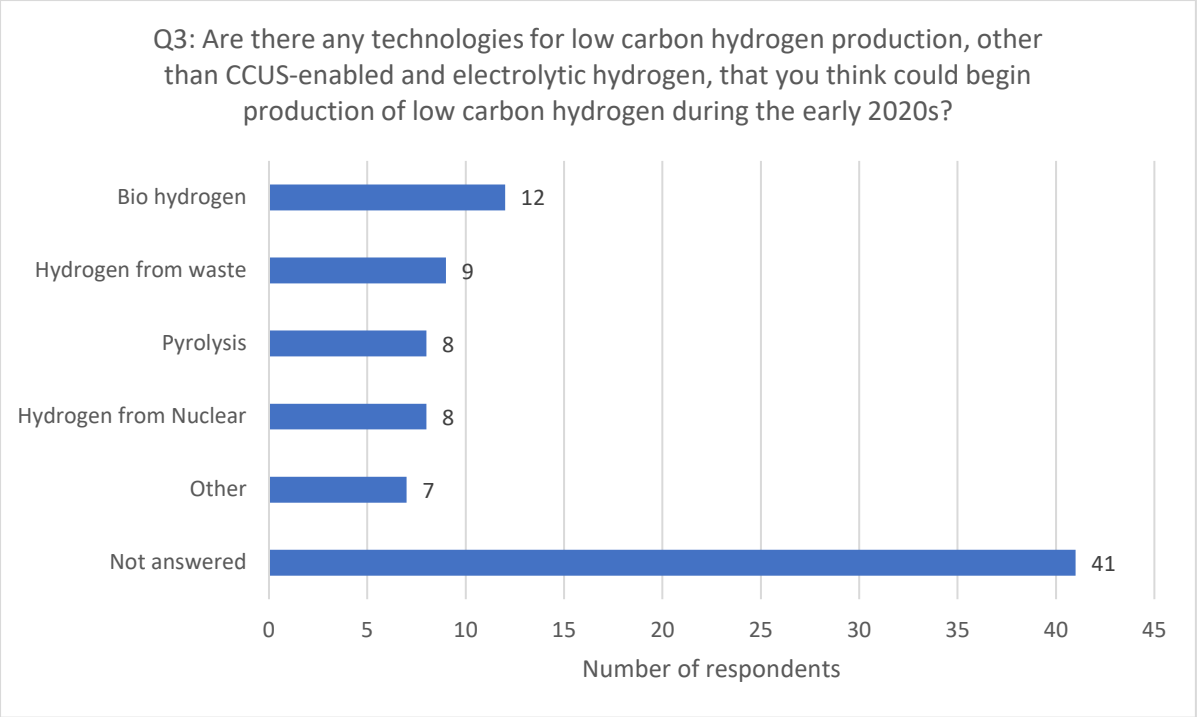

Figure 3: Summary of responses to question 3

Summary of responses

90 respondents answered question 2. Of those who answered, 77% agreed (69 respondents), 18% disagreed (16 respondents) and 6% (5 respondents) answered

the question without stating agreement or disagreement. This shows broad support for the scope of the Fund.

65 respondents answered question 3. Respondents identified 9 ‘other production routes’ for low carbon hydrogen. The top 4 technologies mentioned were bio hydrogen from either biomass or biomethane (18% - 12 respondents), hydrogen from waste (14% - 9 respondents), hydrogen from nuclear power (12% - 8 respondents), and pyrolysis of methane or biomass (12% - 8 respondents).

Another 5 technologies are under ‘other’ in figure 3, with only 1-2 respondents mentioning them. These were: by-product hydrogen from chlor-alkali manufacture (3% - 2 respondents), photosynthetic methods (3% - 2 respondents), pressure swing adsorption combined with grey hydrogen production (2% - 1 respondent), hybrid redox flow battery technology (2% - 1 respondent) and gasification of heavy refinery products (2% - 1 respondent). **(Full theme table can be found in Annex A).**

Our response

To best enable the NZHF to deliver on its objectives, we have considered the range of hydrogen production technologies and their deployment trajectories and intend to split the Fund into four strands, as explained in the ‘what we are consulting on’ section.

The Energy Security Strategy sets out increased ambition for new nuclear this decade, which opens up further opportunities for hydrogen from nuclear pathways. The Net Zero Hydrogen Fund and hydrogen business model have been designed to support all forms of hydrogen production, including from nuclear energy, provided projects meet eligibility requirements. The Low Carbon Hydrogen Standard has also been designed to accommodate hydrogen from nuclear pathways.

Strands 1 and 2 of the NZHF will be open to applications from all hydrogen production technologies able to evidence they meet the required criteria, including meeting the LCHS. Based on the analysis of the hydrogen production project pipeline, we expect projects coming forward to mainly be CCUS-enabled and electrolysis-based technologies. Strands 3 and 4 will be for projects requiring a HBM that meet the required criteria including the LCHS. In the market engagement document for strand 3, we propose that the first window will be open to electrolytic hydrogen projects only. This is to allow for better comparison between projects with similar technologies for this first allocation round, to ensure that assessment remains on track to meet our ambitious timeline. CCUS-enabled hydrogen projects shortlisted for the Phase-2 Cluster Sequencing process will be able to apply for strand 4. Orientating the NZHF in this way will ensure it can support the wider strategic objective of building out the hydrogen economy and creating a diverse and secure energy system.

Consultation question:

4. What boundary should the NZHF set around production projects? Please explain your rationale, including any considerations that may change over time and / or vary according to the types of projects.

Given the aim of the NZHF is to bring forward new hydrogen production facilities, we proposed to focus funding on hydrogen production facilities themselves rather than hydrogen T&S infrastructure.

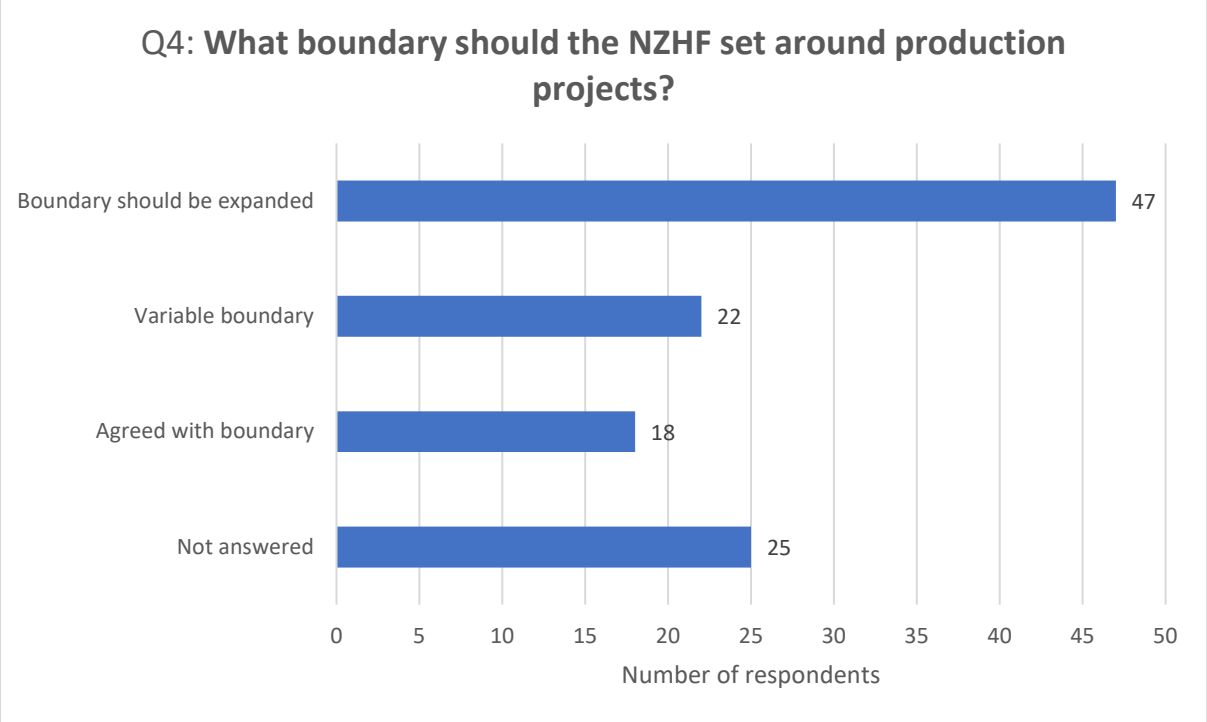

Figure 4: Summary of responses to question 4

Note that some respondents did not explicitly comment on boundaries, instead opting to recommend focusing the fund on certain production technologies. These responses are not included in the above chart but are included full theme table in Annex A.

Summary of responses

81 respondents answered question 4. Of those who answered 58% (47 respondents) said the boundary of the Fund should be expanded beyond core production costs, 22% (18 respondents) explicitly supported the boundary being around core production costs and 27% (22 respondents) suggested the boundaries should be variable. 52% (42 respondents) said the Fund should include support for storage

infrastructure. This shows a strong preference amongst respondents for greater government support around T&S. **(Full theme table can be found in Annex A).**

Our response

Recognising the significant feedback for the NZHF to expand the scope to include support for transportation and storage (T&S) infrastructure, we have expanded the scope of strand 1 (DEVEX) support to include associated on-site T&S FEED costs.

The aim of the NZHF is to bring forward new hydrogen production facilities, and widening the scope of support to cover T&S CAPEX costs would substantially limit the number of production projects we could support. Therefore, funding through strand 2 will be focused on hydrogen production facilities themselves. This will ensure funds are targeted and maximise the deployment that the NZHF can help bring forward. We will keep this position under review as the Fund matures.

We understand the importance of T&S infrastructure for hydrogen production projects and the hydrogen economy more widely. This is why, in the recent Energy Security Strategy, government committed to designing new business models to support the development of hydrogen T&S infrastructure by 2025. It is government's intention that these business models will provide investors and developers with the reassurance they need to bring forward the T&S infrastructure that will be required to meet the government's renewed ambitions in this area.

As set out in the Hydrogen Strategy, we are currently undertaking a review to better understand hydrogen T&S infrastructure requirements in the 2020s and beyond, including the need for financial support and economic regulation. A further update on this work is provided in the HBM government response.

7.3 Type of funding

Consultation questions:

5. Noting the importance of revenue support which could be covered by the Hydrogen Business Model, do you agree that capital grant funding is the most effective option for low carbon hydrogen projects to come forward? Please explain your answer.

6. If capital grants were not available, would you consider applying for government loan funding?

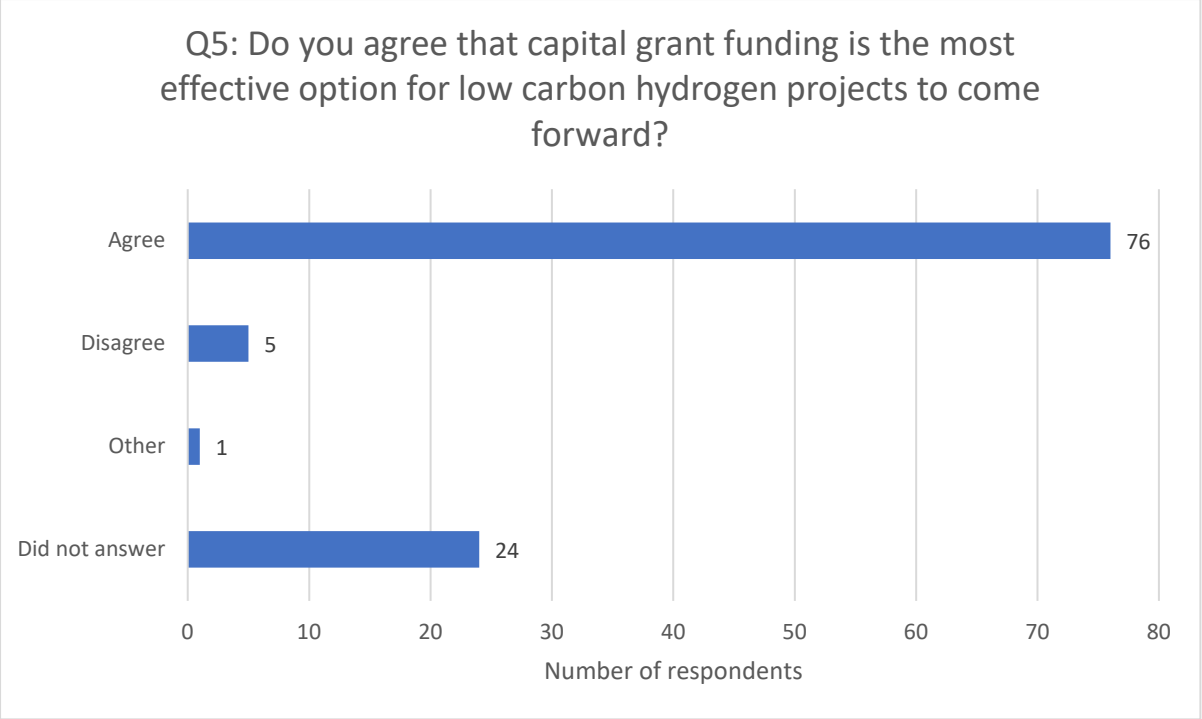

Figure 5: Summary of responses to question 5

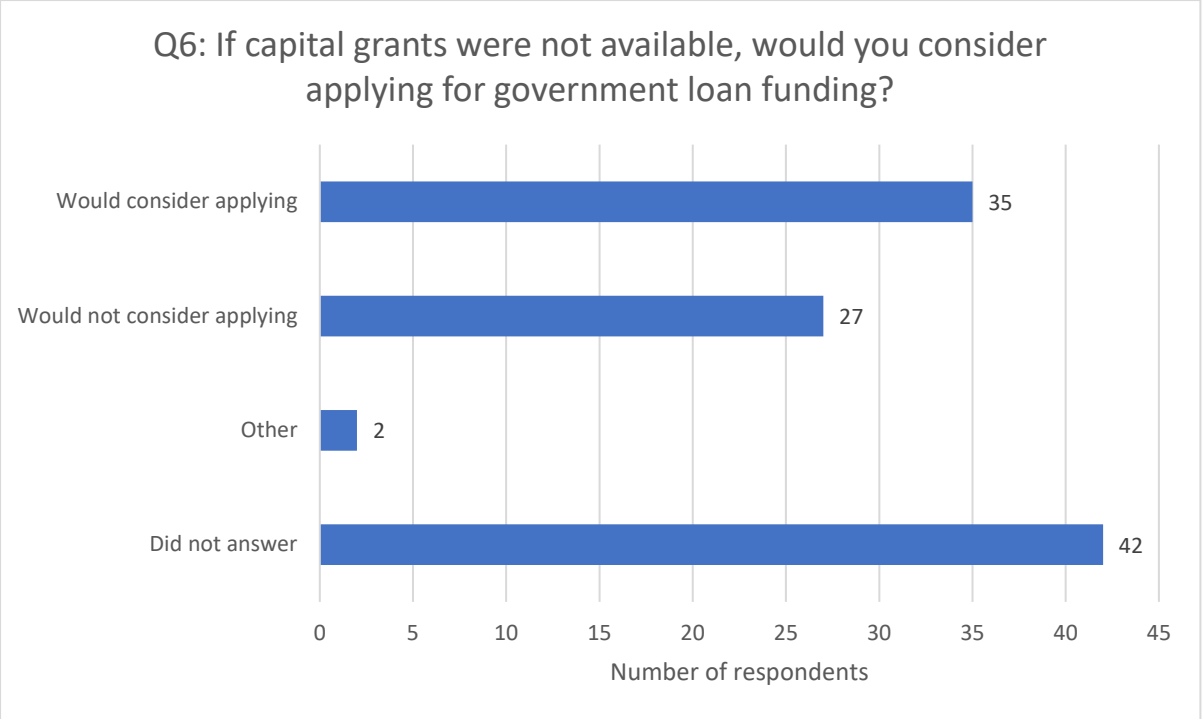

Figure 6: Summary of responses to question 6

Summary of responses

82 respondents answered question 5. Of those who answered 93% (76 respondents) agreed, and 6% (5 respondents) disagreed with our proposal. A further 1% (1

respondents) answered the question without stating agreement or disagreement. This suggests strong support for capital grants.

64 respondents answered question 6. Of those who answered 55% (35 respondents) would consider applying to a loan-based system of funding, and 42% (27 respondents) would not consider applying. 3% (2 respondents) answered the question without specifying whether they would consider applying. This suggests there is a mixed appetite for a loan-based system of funding.

Our response

The NZHF will offer capital grant co-funding via strand 1 for DEVEX and strand 2 for CAPEX, of up to 50% and 30% of eligible costs respectively. As figure 5, shows this approach is widely supported by respondents.

This means we intend to provide financial assistance to eligible projects with no expectation that the funds will be paid back. Capital grant funding improves the economic viability of a project, de-risks private sector investment and will incentivise project development and deployment, while not being as complex to manage as an equity or capital guarantee-based approach.

NZHF capital grants will be paid as a percentage of the total eligible costs which have been defrayed and details of this will set out in the terms and conditions of the grant offer.

7.3 Type of Activity

7.3.1 Building new hydrogen production facilities

Consultation questions:

7. Do you agree that CAPEX support through the NZHF will help projects to reach FID? Please explain your answer.

8. Do you know of any projects that may only want CAPEX support, without a requirement for a hydrogen specific business model, in order to take FID? If so, please give details of the project(s).

9. What reflections do you have on the approach we have identified to address the main challenges in building new hydrogen production facilities?

As set out in the consultation document, the NZHF aims to primarily provide CAPEX support to low carbon hydrogen projects that can deploy during the 2020s, to meaningfully contribute to meeting our 10GW ambition by 2030.

We want to share the risks in entering the nascent hydrogen market with developers through the NZHF, and to accelerate deployment by de-risking investment through Capital Expenditure (CAPEX) co-funding. We proposed to do this by offering a percentage of the initial project cost estimate. This was the proposed approach for respondents to reflect upon.

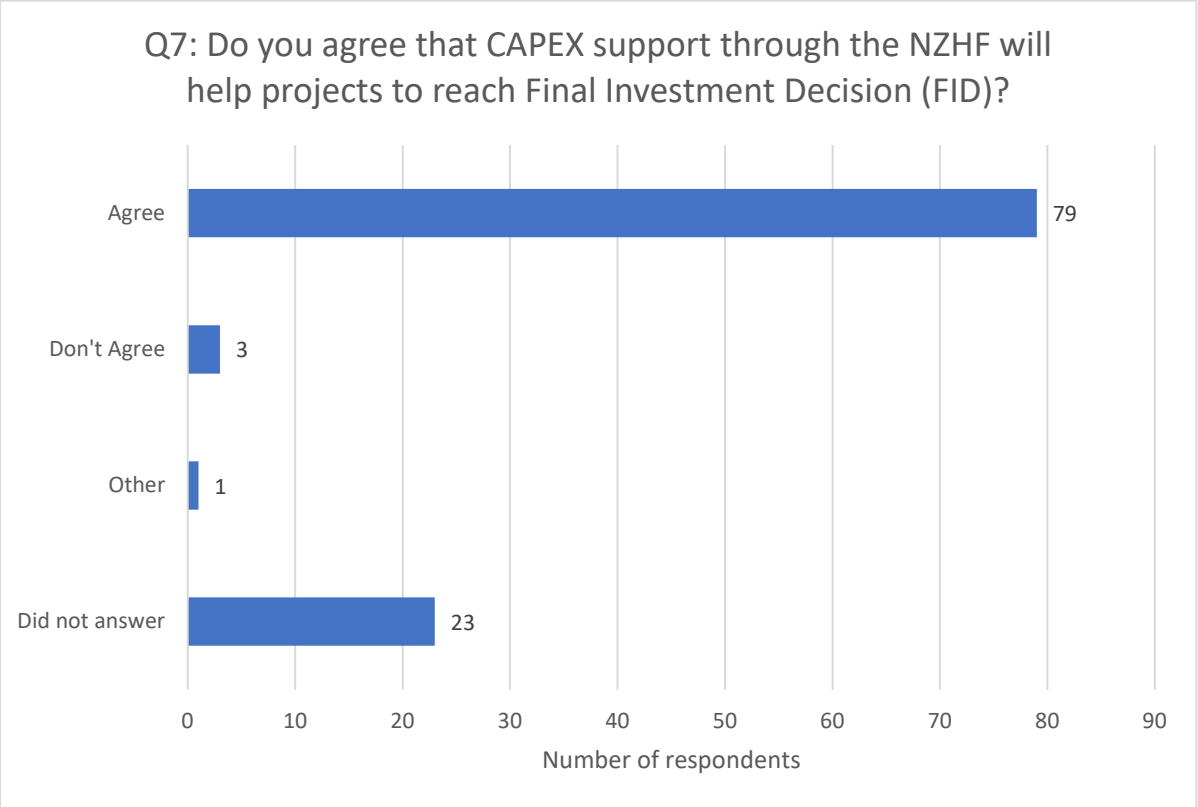

Figure 7: Summary of responses to question 7

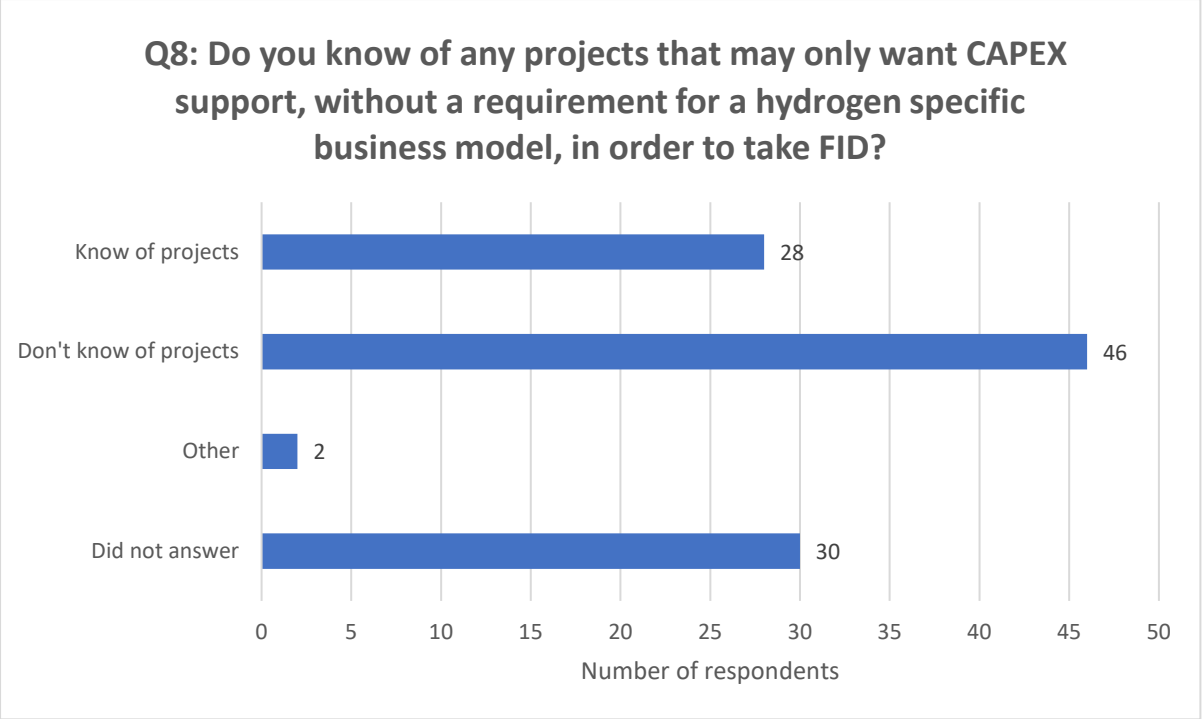

Figure 8: Summary of responses to question 8

Summary of responses

83 respondents answered question 7, of which 95% (79 respondents) agreed and 4% (3 respondents) disagreed that CAPEX support through the NZHF will help projects to reach FID. 77 respondents provided further written commentary, detailing why CAPEX support will help projects by reducing investment risk and attracting investors, thereby encouraging first movers who may otherwise have been put off by the lack of profitability. Several respondents also pointed out the importance of ensuring CAPEX support did not exclude projects from receiving revenue support via a HBM, and that DEVEX needs to also be offered.

76 respondents answered question 8, of which 61% (46 respondents) did not know of any projects that could take FID without the HBM, and a further 37% (28 respondents) did. 39 respondents provided text comments and within those it was noted that different projects, at different scales, would likely require varying levels of support. Projects which could take FID without the HBM included:

- Projects producing hydrogen for transport offtakers, which needed CAPEX in conjunction with the Department for Transport's Renewable Transport Fuel Obligation (RTFO) scheme.
- 'Early adopters' which were proceeding without any subsidy in the hope of obtaining early-mover advantages, mostly at a sub 1MW scale.
- Projects seeking to replace counterfactual fuels which are more expensive than hydrogen.

- Projects which intend to produce valuable co-products alongside hydrogen.

83 respondents answered question 9. 52% (43 respondents) of respondents agreed with the approach set out in the consultation to support first movers with CAPEX co-funding. There was also strong support for the need to invest in hydrogen T&S (20 respondents – 24%), developing hydrogen demand in tandem with supply (15 respondents – 18%), and the importance of focusing on reducing the risk of early-stage electrolytic technology (17 responses –20%). 10 respondents (12%) also raised concern that the size of the Fund was insufficient, stating that the £240m was a modest amount in context of the Fund's ambition and the funding available in other nations such as Germany.**(Full theme table can be found in Annex A).**

Our response

The NZHF strands, explained in the 'what we were consulting on' section, set out how the NZHF will align with the varying requirements and timescales of different types of projects. We note that several respondents to question 7 stated that CAPEX support should not exclude projects from receiving revenue support via the HBM. CAPEX applicants should be aware that applying to strand 2 will exclude them from HBM support, and those seeking both CAPEX and HBM support should apply to strand 3 and 4.

Respondents to question 8 underlined the importance of projects being able to apply for both CAPEX and HBM support, which will be delivered through strands 3 and 4. Projects which do not need revenue support from the HBM, or are relying on other modes of revenue support such as the Department for Transport's the RTFO[14] scheme, will be able to access strand 2, which opens on 25 April 2022.

Projects applying to strand 1 will be able to bid up to 50% of their total eligible costs and applicants will be expected to evidence that their bid represents the minimum funding necessary for FEED and post-FEED activities. The minimum award threshold for strand 1 will be £80,000 and the maximum award threshold will be £15m.

Projects applying to strand 2 will be able to bid up to 30% of their total eligible costs and applicants will be expected to evidence that their bid represents the minimum funding necessary for their project to go ahead. The minimum award threshold for strand 2 will be £200,000 and the maximum award threshold will be £30m

Our response to question 4 explained our approach to T&S costs and how we have changed the scope of strand 1 to cover associated on-site T&S development costs in response to feedback.

[14] The Renewable Transport Fuel Obligation Order regulates renewable fuels used for transport: https://www.gov.uk/guidance/renewable-transport-fuels-obligation

Our Hydrogen Strategy sets out a range of other measures we are undertaking to support hydrogen demand, including supporting research, innovation and commercialisation of hydrogen technologies across a wide range of end uses, alongside testing and at-scale deployment, to help overcome the barriers facing low carbon hydrogen alternatives while allowing the market to determine the optimal technology mix. In doing so, we are aware that current early markets, for example road and depot-based transport, may differ from those where we expect hydrogen to play a more significant role in the longer term, such as in heavy industry. Our Hydrogen Strategy's 2020s roadmap will help us design policy that encourages early use cases while bringing forward applications with the greatest strategic potential to support deep decarbonisation of the UK economy.

7.3.2 Stimulating a future pipeline

Consultation questions:

10. Do you agree that there is a need/demand for government intervention to support hydrogen production projects with their development costs?

11. In light of available funding sources for project development, at what stage of the project life cycle would government support ensure the most effective use of the NZHF's resources and why?

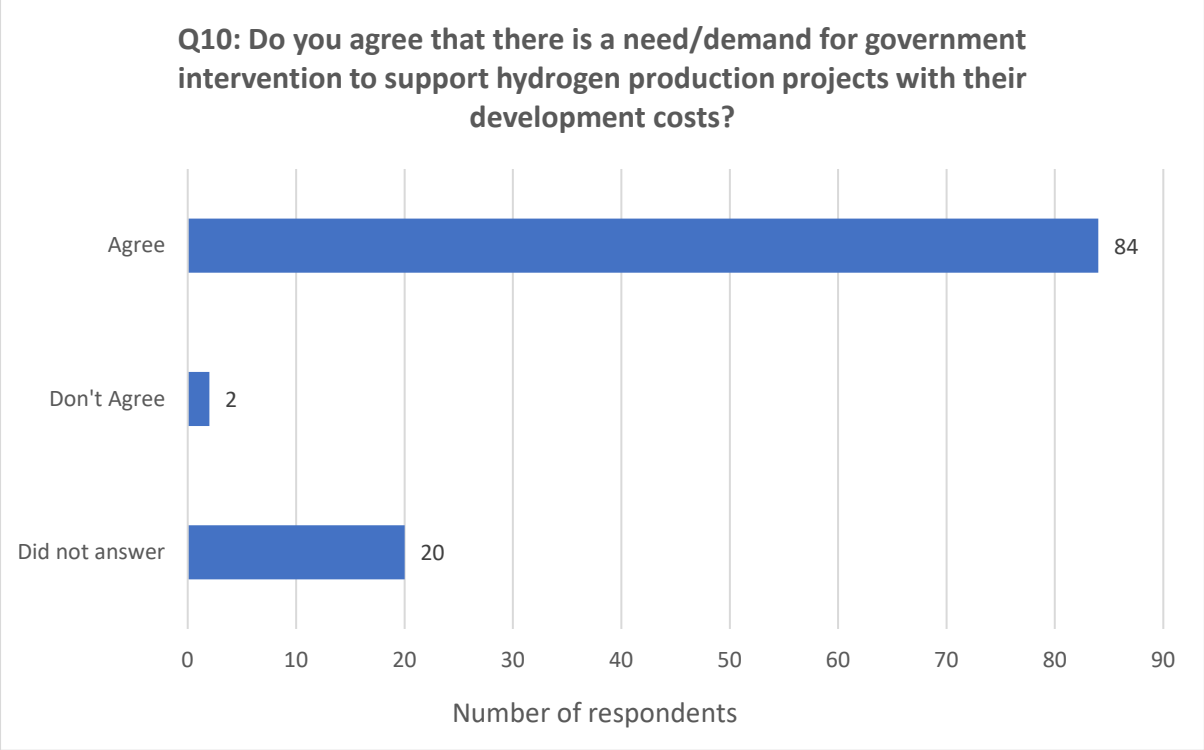

Figure 9: Summary of responses to question 10

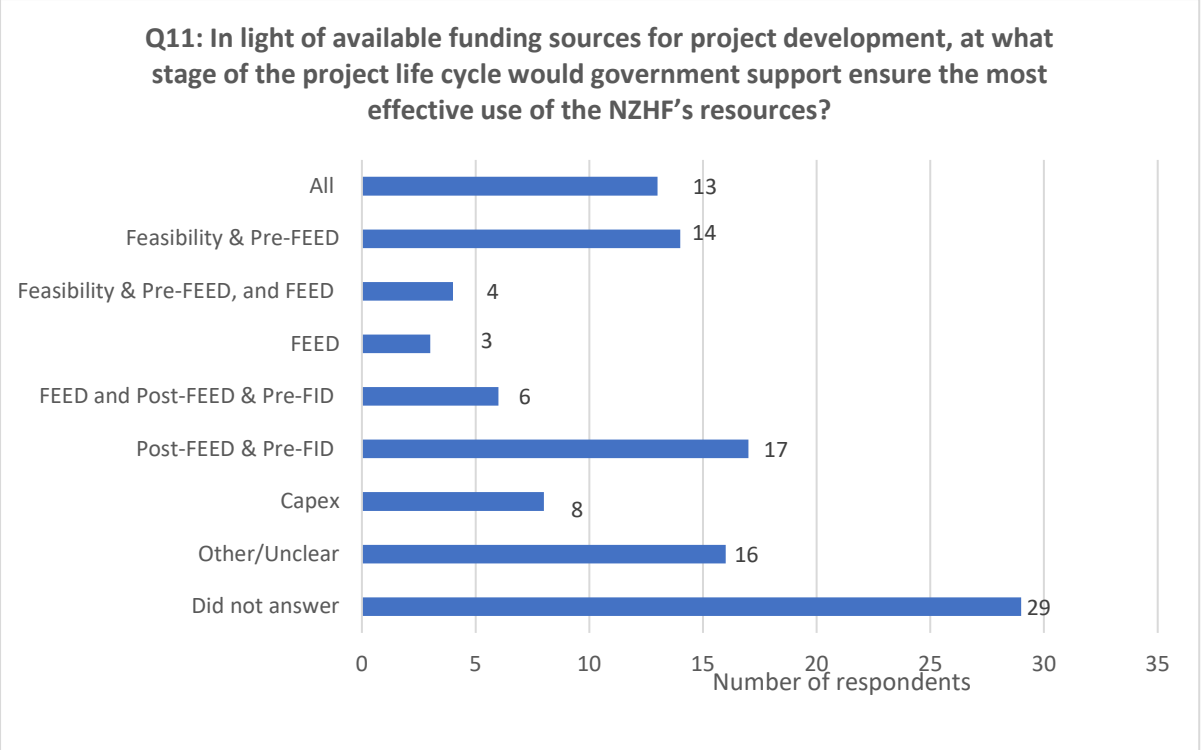

Figure 10: Summary of responses to question 11

Summary of responses

86 respondents answered question 10, of which 98% (84 respondents) agreed that there is a need/demand for government intervention to support hydrogen production projects with their development costs. There were no further text responses to this question.

77 respondents answered question 11. Levels of support were broadly similar for all the proposed stages, with slightly more in favour of supporting the later stages. 27% (21 respondents) were in favour of supporting the earlier stages of the project lifecycle and/or FEED, whilst 34% (26 respondents) were in favour of funding later stages, including FEED and/or post-FEED. A further 17% (13 respondents) stated that all stages should be supported.

Those which supported early stages argued that de-risking at pre-FEED is crucial to allowing the projects to become investable. A common theme in the responses of those in support of funding the later stages of the project cycles was that funding pre-FEED studies was less likely to lead to commercial development, and therefore funding should be targeted at FEED stage onwards. **(Full theme table can be found in Annex A).**

Our response

Following analysis of consultation responses and engagement with industry, we intend to target the first wave of funding through Strand 1 at FEED and post-FEED development costs to stimulate the existing project pipeline and help accelerate projects towards deployment.

This means that feasibility and pre-FEED costs will not be in scope for the first wave of NZHF strand 1 funding, however, we will keep this position under review as the Fund matures.

We also intend DEVEX support for projects to refine FEED outputs. This 'post-FEED' funding could cover costs such as those relating to planning applications and site preparation works. This will ensure projects are able to deploy as quickly as possible.

Where appropriate, support will also be available for FEED and post-FEED costs for associated on-site T&S infrastructure. Projects applying to strand 1 will be able to bid up to 50% of their total eligible costs and applicants will be expected to evidence that their bid represents the minimum funding necessary for FEED and post-FEED activities.

7.4 Eligibility and project assessment criteria

Consultation question:

12. Do you agree with the proposed high-level eligibility criteria for NZHF applications? Please expand your answer.

The high eligibility level criteria proposed in the consultation document set out projects will need to:

- Produce new low carbon hydrogen.
- Be based in the UK.
- Use hydrogen production routes that have a Technology readiness level (TRL) of 7 or above.
- Have at least one agreed offtaker for strand 2 (CAPEX) and demonstrate demand for hydrogen for strand 1 (DEVEX).
- Demonstrate they have the required private sector financial backing and take FID within the required time frame.

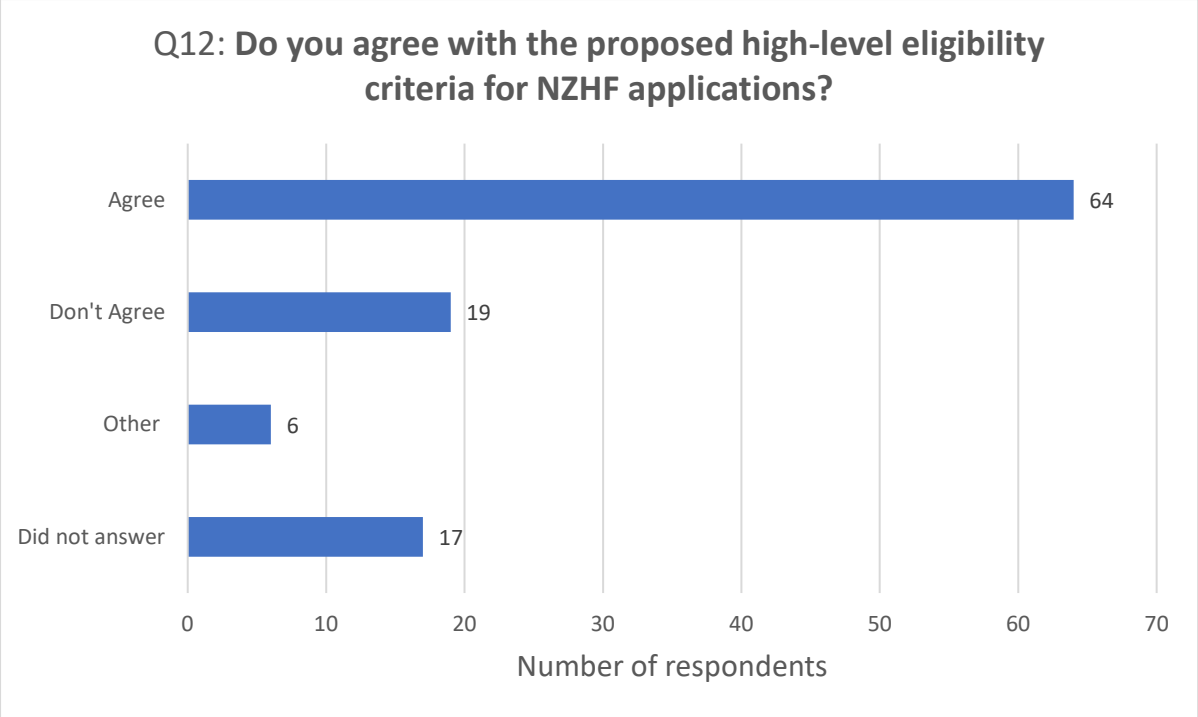

Figure 11: Summary of responses to question 12

Summary of responses

89 respondents answered question 12, of which 72% (64 respondents) agreed with the proposed high-level eligibility criteria and 21% (19 respondents) did not agree. 7% (6 respondents) answered the question but did not clearly agree or disagree. 81 respondents provided further comments. The most common issued raised, from 33% (27 respondents) of the overall respondents, was around the proposed criteria for projects to have an agreement in principle with an offtaker. Respondents highlighted the practical challenges of obtaining offtake agreements in context of a nascent industry, particularly when it comes to agreeing set volumes of hydrogen and specific dates. A common response was that a less stringent requirements, such as a Memorandum of Understanding (MOU) or letter of intent (LOI) could be sufficient and/or more appropriate. Some respondents also pointed out that BEIS should account for producers and users linking through shared developments (e.g. 'hubs').

Other critiques centred around the financial backing criteria being too stringent (15% - 12 respondents), particularly for early-stage projects seeking DEVEX. A further 11% (9 respondents) suggest a requirement for core technologies to be Technology Readiness Level (TRL) 7 or more to be too high due to certain technologies not being proven at the scale many projects are proposing, and therefore recommend a greater flexibility in the proposed approach at consultation. 6% (5 respondents) also recommended GHG emissions should be calculated for each project and taken into account in award decisions. **(Full theme table can be found in Annex A).**

Our response

Our proposed eligibility criteria are designed to ensure financial support is aligned with NZHF's strategic objectives, provide clarity to market participants on what projects could potentially receive financial support, and to discourage speculative applications.

We are aware that some projects are concerned about the requirement for production technologies to be at a TRL of at least 7. This requirement is to ensure the NZHF supports deployment of hydrogen production capacity that can realistically contribute to our 2030 ambition, rather than assisting early stage innovation which is covered by BEIS innovation Funds, such as HySupply-2. It is hoped that this level will also not exclude projects using existing technology in novel formats/configurations.

There was also concern over the stringency of offtaker and financial backing requirements. We believe these remain appropriate for strand 2, because we expect projects to take FID within 3 months of signing the Grant Offer Letter (GOL), and therefore consider it reasonable to require projects to demonstrate they have the necessary private capital and sufficient offtake agreements in place for their projects to be deliverable. Our requirements for strand 1 will recognise that DEVEX applicants will be at an earlier stage of development, and therefore not able to evidence the same level of financial backing and offtaker agreements as a project which is ready to take FID. Therefore, for strand 1 we will ask projects to evidence engagement with potential offtakers and their plans for identifying and developing future opportunities, as well as ensuring they have the financial backing to complete FEED and plans in place to secure funding for deployment.

GHG emissions considerations will be factored in via the 'new low carbon hydrogen production projects' criteria, whereby a project will need to comply with the proposed LCHS[15]. Further assessment and comparison of GHG emissions between projects will be undertaken at assessment stage.

In our consultation we proposed that we would not be setting a minimum grant threshold for the NZHF but advised that we may choose to do so at a later stage. We will now be setting an £80,000 minimum award threshold for strand 1 and a £200,000 minimum award threshold for strand 2. Setting these thresholds is intended to reduce speculative bids and ensure we are only assessing viable

[15] [15] The UK Low Carbon Hydrogen Standard guidance document: https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria

hydrogen production projects capable of contributing meaningfully to our 10GW ambition.

We will also be setting maximum award thresholds. For strand 1 this will be £15m and for strand 2 this will be £30m. The range between the minimum and maximum award thresholds is designed to be broad and should not limit the number of credible applicants in a nascent market.

Further information on the eligibility criteria can be found in the competition brief documents, which will include the methodology for how we will evaluate each criterion. Further information for strand 3 criteria will be available in the ME exercise document[16].

Portfolio selection

To ensure the NZHF delivers a diverse and balance spread of projects, we intend to adopt a portfolio approach which will build in additional policy levers / controls to the project selection process. This approach means that it is possible that an application that receives lower assessors' scores may be recommended for funding over others to achieve a more balanced portfolio of projects. Further information on the portfolio design criteria will follow in the competition brief.

Consultation question:

13. Do you agree with the proposed high-level assessment criteria for NZHF applications? Please expand your answer.

The proposed assessment criteria were:

- Deliverability and risk
- Economic benefits
- Market development and learnings
- Scalability and replicability
- Costs
- Emissions reduction

[16] The Electrolytic Market Engagement Document: https://www.gov.uk/government/consultations/hydrogen-business-model-and-net-zero-hydrogen-fund-market-engagement-on-electrolytic-allocation

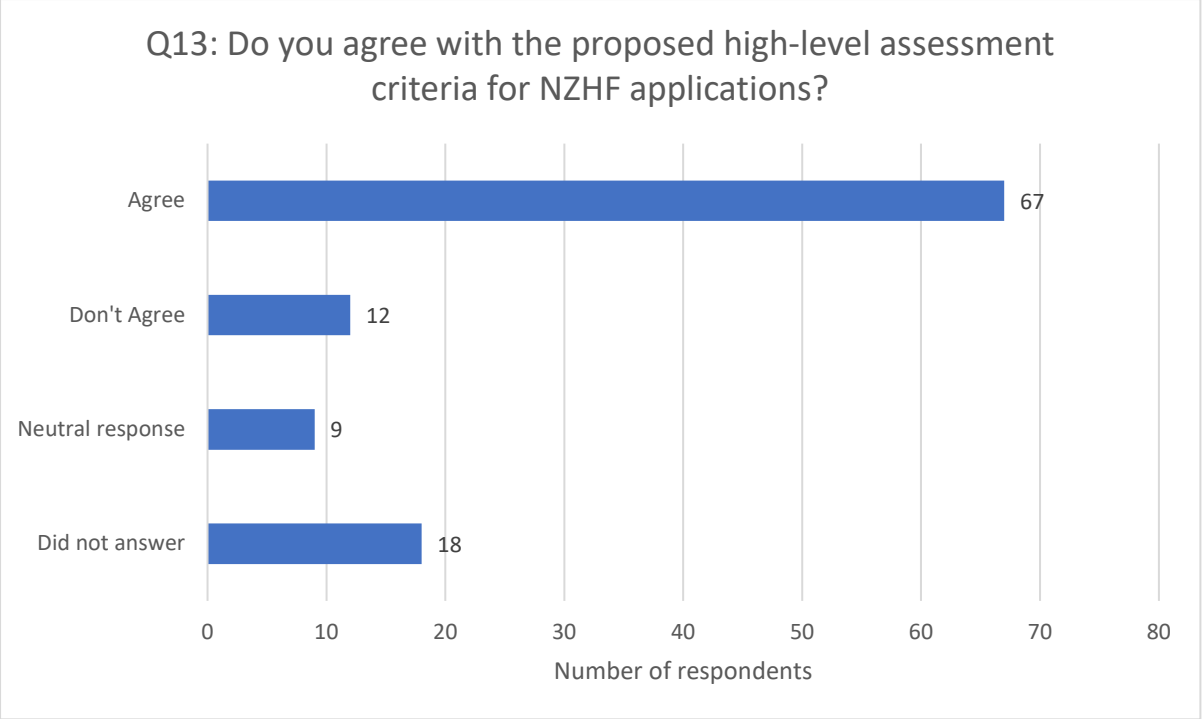

Figure 12: Summary of responses to question 13

Summary of responses

88 respondents answered question 13, out of which 76% (67 respondents) agreed with the proposed assessment criteria at consultation and 14% (12 respondents) did not agree. A further 10% (9 respondents) provided neutral responses. A number of respondents who agreed with the broad criteria did raise specific concerns and comments. This included 11% (8 respondents) commenting on the criteria being too broad, 12% (9 respondents) commenting on the need for clear weighting to highlight relative importance, 11% (8 respondents) commenting on the need for a clear methodology for calculating emissions reduction and 7% (5 respondents) asking for further clarity on what is meant by 'scalability'.

Out of the 14% (12 respondents) which did not agree there were no significant unifying themes. Concerns were raised about the emissions criteria not being tight enough, and also being difficult to assess on outset in the context of unproven technology. Respondents also wanted greater clarity on what is meant by 'cost effectiveness' and 'reasonable delivery schedule'. Scalability assessment was another point of concern, in particular how it would be measured before factories were built and how regional benefits would be considered. **(Full theme table can be found in Annex A).**

Our response

There was strong support for our proposed assessment criteria, and we have reflected this in the final design of the NZHF's assessment criteria for strands 1 and

2. We have considered the feedback on our proposed criteria and in collaboration with our delivery partner, UKRI, have designed final assessment criteria that aim to deliver against the objectives of strand 1 and 2. The final criteria are as follows:

- Deliverability
- Risk
- Project governance and stakeholder management
- Emissions and wider environmental impacts
- Commercial
- Economic benefits and project significance
- Hydrogen market development and knowledge sharing

Further information on how individual criteria for strands 1 and 2 will be assessed, as well as their individual weightings, will be available in the competition brief documents, which will be published on 19 April 2022.

Following a parallel consultation exercise on the LCHS, we also plan to include in the NZHF assessment process consideration of whether producers can provide proof of using additional low carbon electricity. This will help to ensure that projects are rewarded if they meet additionality principles set out in the LCHS consultation response.

As set out in the LCHS consultation response, we recognise that there are demonstratable benefits to linking hydrogen production to new build or life-extended low carbon generation, especially where this is unsubsidised by government support schemes (such as the Contracts for Difference), and that these types of projects should be incentivised and rewarded. Projects that can meet additionality principles are likely to provide significantly lower emissions from a power system perspective as they avoid diverting electricity from other users. They also support deployment of new distributed low carbon generation. We also recognise the benefits of seeking to promote and incentivise the use of excess or curtailed electricity, which we deem should also be considered ‘additional’ for hydrogen production, irrespective of support schemes, as it would not otherwise have been utilised if it were not used in hydrogen production. Electrolytic projects that meet either of these additionality principles will likely be the highest grade from an emissions perspective, and as such may also be eligible for renewable end use support schemes such as the RTFO.

We will therefore incentivise and reward projects that meet additionality principles through allocation of HBM and NZHF support. Projects that meet these principles for additionality will substantively improve their overall scoring when applying for funding through these schemes.

However, we do not think an additionality requirement mandating that hydrogen production be limited to new build, life-extended generation or curtailed electricity should be a requirement in the Standard at this initial stage. In making this decision we have sought to strike a balance between ensuring lowest possible emissions and encouraging growth of a new sector. We are mindful that we need to grow the hydrogen economy rapidly to deliver large scale emissions savings in end use sectors in the longer term. We will keep this under regular review to ensure our position remains appropriate facilitates economy-wide decarbonisation, supporting schemes such as the RTFO. We would expect these reviews to coincide with future hydrogen business model allocation rounds, and as a minimum would occur no less frequently than every two years.

7.5 Bidding System

Consultation question:

14. Do you have any comments on the application process for the NZHF? Please explain any practical considerations the government should take into account when designing the final bidding system.

Summary of responses

69 respondents answered question 14. Of those who answered this question 96% (65 respondents) had comments on the application process and 4% (4 respondents) stated they had no comment. From the comments the key suggestions were having multiple windows (32% - 22 respondents), the urgent need for windows as soon as possible (25% - 17 respondents), providing a clear timetable for windows (20% - 14 respondents), the use of an eligibility screening stage (20% - 13 respondents) and the need to link closely with other funding (19% - 13 respondents). **(Full theme table can be found in Annex A).**

Our response

There was widespread support for our proposed bidding system. We have taken on stakeholder feedback and have designed separate funding allocation windows for each strand, allowing projects with differing deployment trajectories to apply.

Our intention is to launch the first two windows for strands 1 and 2 on 25 April 2022 with strand 1 closing on 22 June and strand 2 closing on 6 July. We intend to open further windows for strands 1 and 2 in early 2023.

The NZHF will be delivered by two delivery partners for strands 1 and 2. UK Research and Innovation (UKRI) will deliver most of the applicant facing functions, including developing and hosting the application portal, supporting the applicants through the application process, assessing the applications, and recommending successful projects to BEIS.

The BEIS Central Grants and Loans team (CGL) will be responsible the grant management of the NZHF. This will include the issue of grant offer letters to successful applicants, making payments, and monitoring the project delivery. We will ensure that it is clear to the applicants who they are engaging with at each stage of the process.

Further information on bidding into the first funding wave for strands 1 and 2 can be found in the competition brief which will be published on 19 April 2022.

We intend to open the first strand 3 joint allocation window in late June/ early July 2022

We intend for CCUS-enabled projects applying for a hydrogen business model through Phase-2 of the CCUS cluster sequencing process to have the opportunity to apply for NZHF capital co-funding (NZHF strand 4). We plan to launch a strand 4 NZHF EOI process following the announcement of the Phase-2 shortlisted projects, followed by a strand 4 application process in early 2023.

7.6 Potential Applicants

Consultation questions:

15. If your organisation is likely to apply to the NZHF, could you please state whether you would be seeking capital or development support and the estimated size of the bid? If your projects require capital support, please also express this as percentage of the overall costs.

16. If you are seeking capital support, what stage of your construction are you looking to get funding for?

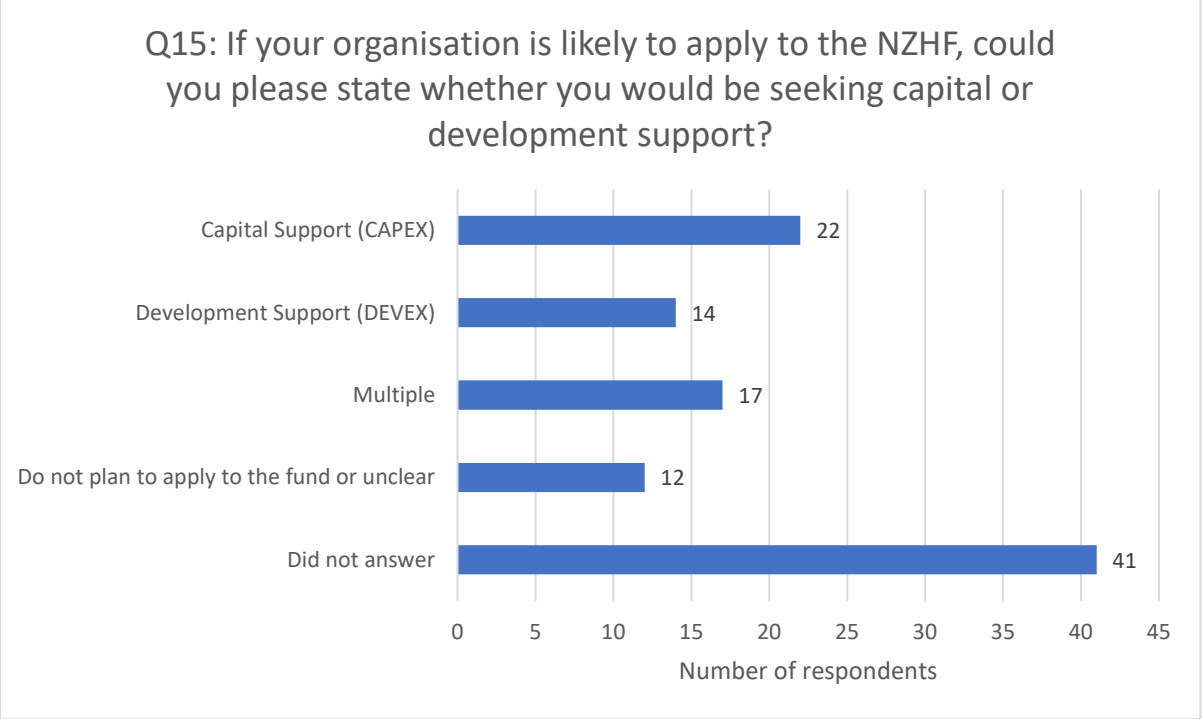

Figure 13: Summary of responses to question 15

Summary of responses

65 respondents answered question 15. Of those who answered this question 34% (22 respondents) stated that their organisation was likely to apply for CAPEX support, 22% (14 respondents) stated that they would require DEVEX support, 26% (17 respondents) stated that they would likely apply for support at both stages, and 19% (12 respondents) said they would not be applying to the Fund, or did not specify. We will not share specific information on estimated bid sizes as this is commercially sensitive.

64 respondents answered question 16. As there was not a clearly defined set of construction stages from respondents, and stages would be context dependent, we have chosen not to group these responses. We have still read and considered all responses received.

Our response

We have combined the project details provided by respondents with information from other sources, such as bilateral meetings, technical advisors and project pipeline intelligence, to build an understanding of the UK hydrogen market which has helped inform our policy making.

We have noted the demonstrable need for CAPEX and DEVEX from a range of projects as well as the varying deployment trajectories. This has helped to inform our decision to split the NZHF into strands. As mentioned in our previous responses, the

Fund will be focused on providing CAPEX support to the considerable number of projects able to deploy on that basis. We will also be providing late stage DEVEX support to help projects get closer to FID, thereby stimulating a pipeline of projects.

8. Next Steps

The government response to this consultation, identified the following themes:

- Respondents generally approved our rationale, proposed scope and bidding system.
- Projects had different financial support needs and deployment trajectories, which the Fund would need to be flexible in catering to.
- Respondents generally agreed with our Eligibility and Assessment criteria, however there was some concerns over the stringency of our eligibility criteria.
- A significant number of projects encouraged BEIS to do more to cover off T&S infrastructure costs.
- There was a slight preference for DEVEX to be aimed at later stages of the project life cycle.

These themes have helped shape the final policy design for strands 1 and 2 of the NZHF. The detailed eligibility requirements will be set out in **the strand 1 and 2 competition brief.**

We have published a market engagement exercise alongside this document, which sets out further details and seeks industry feedback on strand 3. We intend for this allocation round to open in late June/ early July 2022.

For Strand 4, we expect to run an EOI process following the announcement of the Phase-2 shortlisted projects. Interested projects will then be asked to submit a full application to the NZHF (in early 2023), alongside the HBM negotiations.

9. Contact Details

Enquiries to:

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Annexes

Annex A – Data set

Question 1 response themes

	Theme	Responses (#)	Response (%)
1.1	New highly skilled jobs will be created/support the transition/protect jobs in high emission sectors	37	41%
1.2	Establish the UK as an international centre of excellence/global leadership	27	30%
1.3	Support regional characteristics/local economies	23	25%
1.4	Create export opportunities	18	20%

Question 3 response themes

	Theme	Responses (#)	Response (%)
3.1	Bio-hydrogen (from biomass & biomethane)	12	18%
3.2	Hydrogen production from waste	9	14%
3.3	Support for nuclear-powered hydrogen production	8	12%
3.4	Pyrolysis of methane or biomass	8	12%

3.5	Other hydrogen production technologies (breakdown below)	7	11%
3.5a	By-product hydrogen from chlor-alkali manufacture	2	3%
3.5b	Photosynthetic methods	2	3%
3.5c	Pressure swing adsorption combined with grey hydrogen production	1	2%
3.5d	Hybrid redox flow battery technology	1	2%
3.5e	Gasification of heavy refinery products	1	2%
3.6	Focus on renewable energy hydrogen and avoid CCUS	6	9%

Question 4 response themes

Theme				
	No boundary	Variable boundary	Expand boundary beyond production projects	No comment
Responses (#)	5	22	47	1
Responses (%)	6%	27%	58%	1%

Note that these sectors are not mutually exclusive as some respondents support variable boundaries for production projects and also expanding the scope to include hydrogen storage and/or transportation. Also note that some respondents did not explicitly comment on boundaries, instead opting to recommend focusing the Fund on certain production technologies. The percentages above have been calculated using the total number of responses to this question, 81.

	Theme	Responses (#)	Responses (%)
4.3	**Expanding the NZHF to include support for storage, distribution, and supply**		
4.3b	Inclusion of support of distribution & supply infrastructure	42	52%
4.3a	Inclusion of support of storage infrastructure	39	48%
4.3c	Inclusion of support for hydrogen supply in the transport sector (e.g. refuelling infrastructure)	5	6%
4.2	**Prioritisation and focus of support**		
4.2a	Prioritising support of production facilities	18	22%
4.2b	Focus of support for hydrogen production using renewable energy sources ("green hydrogen")	14	17%
4.2d	Focus on funding early-stage production and/or demonstrative projects	14	17%
4.2e	Inclusion of support for hydrogen production operational costs	9	11%

4.2c	Focus of support for hydrogen produced using nuclear energy sources ("pink hydrogen")	2	2%
4.1	**Boundary definition**		
4.1e	Boundaries should be finance-dependent	10	12%
4.1a	No boundaries for production projects	5	6%
4.1d	Boundaries should be time-dependent / variable over time	5	6%
4.1c	Boundaries should be feasibility-dependent or efficiency-dependent	3	4%
4.1b	Boundaries should be kept to UK-based production facilities	2	2%

Note that these themes are not mutually exclusive. Some responses that prioritise production identify the need to expand the boundary of the NZHF beyond production projects.

Question 9 themes:

	Theme	Responses (#)	Response (%)
9.1	General agreement with the approach being taken, usefulness of CAPEX support and encouraging of first movers.	43	52%
9.2	Responses that highlight the need to invest in hydrogen supply	20	24%

	chains (storage, transmission, and transportation)		
9.3	Early stage of green hydrogen technology and associated risk which, if reduced, can increase investment attractiveness.	17	20%
9.4	The need to develop hydrogen demand in tandem with hydrogen supply.	15	18%
9.5	Need to prioritise allocation according to needs, especially first movers with high learning costs.	15	18%
9.6	The importance of electrolytic hydrogen projects and the need for greater NZHF support.	13	16%
9.7	The need for Hydrogen Business Models as well as NZHF support.	12	14%
9.8	Insufficiency of allocated funds, and the perception that the required support could possibly far exceed £240m.	10	12%
9.9	The need for a streamlined and accelerated application and funding process for targets to be met.	7	8%
9.10	Responses stating that the government should employ a more holistic approach	6	7%

	considering the full cycle of requirements.		
9.11	Blue hydrogen does not have a place in any net zero strategy, due to its unaddressed challenges.	5	6%
9.12	Responses stating both blue and green technologies should receive suitable support.	4	5%
9.13	Responses stating that it is important businesses cannot claim money from more than one subsidy scheme. (NZHF, Hydrogen Business Model, RTFO)	2	2%

The percentages above have been calculated using the total number of responses to this question, 83. Where a responder has noted multiple separate themes in their response, these will have been counted separately.

Question 11 themes:

	Theme	Responses (#)	Response (%)
11.1	All (Feasibility & Pre-FEED, FEED, Post-FEED & Pre-FID)	13	17%
11.2	Feasibility & Pre-FEED	14	18%
11.3	Feasibility & Pre-FEED, and FEED	4	5%
11.4	FEED	3	4%
11.5	FEED and Post-FEED & Pre-FID	6	8%

11.6	Post-FEED & Pre-FID	17	22%
11.7	“CAPEX” phase	8	10%
11.8	Other response or unclear preference	16	21%

The percentages above have been calculated using the total number of responses to this question, 77. Where a responder notes two separate stages in their response, both of these will have been counted separately.

Theme				
	All stages	**Early stages (Feasibility/pre-FEED/FEED)**	**Later stages (FEED/Post-FEED)**	**Other (incl CAPEX)**
Responses (#)	13	21	26	24
Responses (% of total 77 respondents)	17%	27%	34%	31%

Question 12 themes:

	Theme	**Responses (#)**	**Response (%)**
12.1	Achieving an agreement in principle with an offtaker in advance may be challenging – a Letter of Intent or Memorandum of Understanding could be considered.	27	33%
12.2	Demonstrating the required private sector financial backing may be challenging as investments may be reliant on award of the NZHF funding.	12	15%

12.3	Technology Readiness Level of 7 or above is too high.	9	11%
12.4	GHG emissions should be calculated for each project and taken into account during the award decision process.	5	6%

The percentages above have been calculated using the total number of text responses to this question, 81. Where a responder has noted two separate themes in their response, both of these will have been counted separately.

Question 13 themes:

	Theme	Responses (#)	Response (%)
13.2	There should be a clear weighting to highlight the importance of each assessment criteria.	9	12%
13.1	Proposed assessment criteria are currently too broad, and need narrowing down.	8	11%
13.3	There needs to be a clear methodology for calculating emissions reductions	8	11%
13.4	Further clarity on scalability is needed, such as confirmation of whether there is an obligation to scale up in future.	5	7%

The percentages above have been calculated using the total number of text responses to this question, 76. Where a responder has noted two separate themes in their response, both of these will have been counted separately.

Question 14 themes:

	Theme	Responses (#)	Response (%)

14.1	Use multiple rounds	22	32%
14.2	Competition urgency and the need for adequate notice	17	25%
14.4	Clear timeframe for bidding windows	14	20%
14.3	Use eligibility screening	13	19%
14.5	Link to other funding schemes	13	19%

The percentages above have been calculated using the total number of responses to this question, 69. Where a responder has noted two separate themes in their response, both will have been counted separately.

Annex B - Statement responses

Of the 106 responses submitted to the consultation, 9 took the form of statements rather than responses to the questions provided. These statements have been analysed and considered by BEIS as part of the consultation process. These responses varied significantly in content however, all responses supported the proposals set out in the consultation and approved of the support for growing the low carbon hydrogen sector in the UK. The main themes of the statements are summarised in the table below:

	Theme	Responses (#)	Response (%)
S.1	Support multiple technologies	6	67%
S.2	Consideration of project development timelines	2	22%
S.3	Requirement for CAPEX support to reach Final Investment Decision	2	22%

S.4	Align with existing and similar funds	2	22%
S.5	Concern with interaction between grant funding and revenue support scheme	1	11%
S.6	Prioritise translational projects	1	11%
S.7	More support for Green Hydrogen	1	11%
S.8	Encourages working closely with DAs	3	33%
S.9	Highlights opportunities in local area or constituent country of UK	4	44%

The percentages above have been calculated using the total number of responses as open statements, 9. Where a responder has noted two separate themes in their response, both of these will have been counted separately.

Annex C – Consultation questions list summary

1. **What wider benefits could the NZHF deliver, such as local growth and low carbon leadership opportunities?**

2. **Do you agree with the proposed scope for the NZHF?**

3. **Are there any technologies for low carbon hydrogen production, other than CCUS-enabled and electrolytic hydrogen, that you think could begin production of low carbon hydrogen during the early 2020s? Please give details.**

4. **What boundary should the NZHF set around production projects? Please explain your rationale, including any considerations that may change over time and / or vary according to the types of projects.**

5. **Noting the importance of revenue support which could be covered by the Hydrogen Business Model, do you agree that capital grant funding is the most effective option for low carbon hydrogen projects to come forward? Please explain your answer.**

6. **If capital grants were not available, would you consider applying for government loan funding?**

7. **Do you agree that CAPEX support through the NZHF will help projects to reach Final Investment Decision? Please explain your answer.**

8. **Do you know of any projects that may only want CAPEX support, without a requirement for a hydrogen specific business model, in order to take FID? If so, please give details of the project(s).**

9. **What reflections do you have on the approach we have identified to address the main challenges in building new hydrogen production facilities?**

10. **Do you agree that there is a need/demand for government intervention to support hydrogen production projects with their development costs?**

11. **In light of available funding sources for project development, at what stage of the project life cycle would government support ensure the most effective use of the NZHF's resources and why?**

12. **Do you agree with the proposed high-level eligibility criteria for NZHF applications? Please expand your answer.**

13. **Do you agree with the proposed high-level assessment criteria for NZHF applications, and in particular? Please expand your answer.**

14. **Do you have any comments on the application process for the NZHF? Please explain any practical considerations the government should take into account when designing the final bidding system.**

15. **If your organisation is likely to apply to the NZHF, could you please state whether you would be seeking capital or development support and the estimated size of the bid? If your projects require capital support, please also express this as percentage of the overall costs.**

16. **If you are seeking capital support, what stage of your construction are you looking to get funding for?**

Annex D – List of respondents

The following organisations responded to the government response. Two personal responses were also received from individuals.

Aberdeen City Council

Acorn (Storegga, Shell, Harbour)

Adelan Ltd

Adynaton Asset Management LLP

Aldersgate Group

AMP Clean

Association for Decentralised Energy

B9 Energy

Bellona

Booth Industries

BP

BPP Technical Services Limited

Cadent

Carbon Capture and Storage Association

Carlton Power/Trafford Green Hydrogen Ltd

Chelmor Creo

Conrad Energy

Cudd Bentley

Dalton Nuclear Insitute

Design and Consulting Engineers

DG Alliance

Drax

EasyJet

EDF

Emerald Green Power

Energy UK

Eneus Energy

Eni UK

EON

Equinor

ESSAR OIL UK Limited

First Hydrogen

Fluor Ltd.

Gemserv

Gigastack

Greater South East Energy Hub

Green Alliance

Green liquid hydrogen production

GTIP

H2 Green

H2Transition Capital LLP

Halton Borough Council

HY2GO

HyCymru, Wales Hydrogen Trade Association

Hydrogen UK (previously Hydrogen Taskforce)

Hydrologiq Ltd

HyGen (formerly Ryze Hydrogen)

Ikigai Capital + Thames Estuary Growth Board

Inovyn (an INEOS Company)

Iogen Corporation

Islandmagee Energy

ITM Motive

ITM Power

Kanay

Kiwa Ltd

Koso Kent Introl ltd

Lancashire LEP

Liquid Hydrogen Start-up

Manufacturing Technology Centre

MCS Charitable Foundation

Midlands Engine

Mutual Energy

National Grid

National Nuclear Laboratory

Neptune Energy

Net Zero Scientific Ltd

Next Gen Renewables

North Wales regional view (North Wales Economic Ambition Board and Welsh Government North Wales Delivery Team)

Nuclear Industry Association

NVH Global Ltd

NW HYDROGEN ALLIANCE

Octopus Renewables &RES partnership

OGUK

OMNI Conversion Technologies

Orsted

Progressive Energy

REA

RenewableUK

Rhizome Energy Ltd

Ricardo Automotive & Industrial

RWE generation

Scottish Power

Scottish Renewables

SG Financial Ltd

Shetland Islands Council

Siemens Energy

Sizewell C

Skuunaq Energy

SSE Thermal

Statera

Statkraft

SWLEP

Technip FMC

Tees Valley Combined Authority

Toshin

TWI Ltd

Tyseley Energy Park

UK Atomic Energy Authority

UKHFCA

UKPIA

Uniper

Valero Energy Ltd

Waterwhelm

Westinghouse Government Services UK

Annex E – Glossary

Acronym	Definition
CCUS	Carbon Capture, Usage and Storage
DEVEX	Development Expenditure
EOI	Expression of Interest
FEED	Front End Engineering Design
GOL	Grant Offer Letter
GW	Gigawatt
HBM	Hydrogen Business Model
LCHS	UK Low Carbon Hydrogen Standard
NZHF	Net Zero Hydrogen Fund
RTFO	Renewable Transport Fuel Obligation
T&S	Transport and storage
TRL	Technology Readiness Level

Term	Definition
10 Point Plan	Sets out the approach government will take to build back better, support green jobs, and accelerate our path to net zero
Allocation	The process of allocating revenue support through the hydrogen business model.
Blue hydrogen	Low-carbon hydrogen produced from-methane reformation with CCUS.
Business model	The mechanism which government proposes to establish to support producers of low-carbon hydrogen.

Carbon Capture Utilisation and Storage	The process of capturing carbon dioxide from industrial processes, power generation, certain hydrogen production methods. The captured carbon dioxide is then either used or stored permanently.
CCUS cluster sequencing process	The process by which CCUS industrial clusters are chosen, with two anticipated by the mid-2020s, and a further two clusters by 2030 as outlined in the 10 Point Plan.
Counterfactual fuels	The main fuel currently used in an end use sector, which a low-carbon alternative could replace.
Electrolysis	A hydrogen production process which involves using electricity to generate hydrogen from water, with no CO_2 emissions at the point of production. Low-carbon hydrogen is created when low-carbon electricity is used as the input fuel.
Green hydrogen	Low-carbon hydrogen produced from electrolysis, with renewable electricity as the input fuel.
Carbon intensive hydrogen	Hydrogen that is produced from un-abated methane-reformation, commonly used in industrial processes.
Low-carbon hydrogen	Hydrogen that is produced with significantly lower greenhouse gas emissions compared to current methods of production – methods include methane reformation with CCUS or electrolysis using renewable electricity.
Methane-reformation	A process for hydrogen production in which methane is the input fuel.
Net Zero	Legislation passed by the government to reduce greenhouse gas emissions to net zero by 2050.
Net Zero Hydrogen Fund	A £240m fund to support low-carbon hydrogen production.
Renewable Transport Fuel Obligation	A requirement on suppliers of transport and non-road mobile machinery fuel in the UK to show that a percentage of the fuel they supply comes from renewable and sustainable sources.

Revenue support	The funding provided on an ongoing basis, for the agreed term, in order to support the operations of the low-carbon hydrogen producer, which would cover a proportion of operating costs and an appropriate rate of return on the private sector capital invested.

This publication is available from: www.gov.uk/government/consultations/designing-the-net-zero-hydrogen-fund

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