SIF Alpha Round 2 Project Registration

Date of Submission

Project Reference Number

10086458

Initial Project Details

Project Title

Connectrolyser

Project Contact

innovation@ukpowernetworks.co.uk

Challenge Area

Improving energy system resilience and robustness

Strategy Theme

Net zero and the energy system transition

Lead Sector

Electricity Distribution

Project Start Date

01/10/2023

Project Duration (Months)

6

Lead Funding Licensee

UKPN - Eastern Power Networks Plc

Funding Mechanism

SIF Alpha - Round 2

Collaborating Networks

UK Power Networks

National Gas Transmission PLC

Technology Areas

Active Network Management

Hydrogen

Control Systems

Project Summary

Connectrolyser will optimise electrolyser operation at hydrogen hubs by exploiting flexible operation to help manage the electricity network, excess renewable generation, hydrogen customers and onsite storage. This will avoid the need for traditional firm capacity connections, the preferred choice among hydrogen developers and producers, which have longer lead times and higher costs. Connectrolyser will also explore novel offerings for electrolysers to support security of supply.

Up to 8GW of electrolysers are predicted to connect to UK distribution networks by 2050. This project could save up to £30bn in network reinforcement costs by dynamically managing the system for whole system optimisation.

Add Preceding Project(s)

10061343 - Connectrolyser

Add Third Party Collaborator(s)

HydroGenus

Project Budget

£555,330.00

SIF Funding

£489,483.00

Project Approaches and Desired Outcomes

Problem statement

Government targets for the transition to Net Zero are for at least 5GW of green hydrogen production by 2030, and forecasts show that up to 8GW of electrolysers will connect to the distribution network by 2050. However, developers and producers are likely to default to traditional firm electricity connections, as they give certainty of supply. This will create constraints on networks, resulting in long lead times to connect and higher costs for all network customers.

An alternative is to enable DNOs to rapidly approve and support flexible electrolyser connection requests that avoid increasing peak demand. This would allow for more rapid deployment of green hydrogen production and help to reduce the overall cost of the transition to Net Zero.

The Discovery Phase compared existing connection products and flexibility models to the needs of hydrogen producers. This helped to deepen our understanding of regulatory, commercial, and technical barriers. As a result of this we developed the following detailed and refined problem statements, which fall within the original problem statement explored in the Discovery Phase:

· Even with established flexible connection products, forecasted uptake of electrolysers will result in significant network reinforcement. It is worth investigating if a different approach could be used to support electrolyser uptake in a way that requires less reinforcement.

· Hydrogen projects must be located near customers due to the difficulty and expense in transporting hydrogen and so are unlikely to relocate their operations to where there is greater network capacity.

· Proton Exchange Membrane (PEM) electrolysers can ramp up and down dynamically to optimise whole system operation. However, it is not wholly known how they will respond to a flexible connection regime in practice and the impact this has on their life and efficiency.

· The control systems to enable the electrolyser to take full advantage of the flexible connection capability that DNOs can provide are not currently available.

Connectrolyser evolved through the collective insight, modelling and analysis undertaken by the team. We refined the proposed solutions to:

· Explore how electrolysers can contribute to security of supply (SoS) as defined in the Distribution Code (DCode).

· Build the case for making use of existing network capacity that is reserved for security of supply purposes in exchange for providing a security service as described in Engineering Recommendation (EREC) 130.

· Conduct further research into the technical flexibility of PEM electrolysers and control systems, as an essential prerequisite to the above point.

Project addresses four themes:

1. Supporting a just energy transition by avoiding cost burden, on all consumers, of upgrading distribution networks to support the emerging hydrogen economy.

2. Preparing for a Net Zero power system by using flexibility to optimise production of green hydrogen.

3. Improving energy system resilience and robustness by harnessing the potential of hydrogen hubs to contribute to security of supply.

4. Accelerating decarbonisation of major energy demands by facilitating the rapid and lower cost connections needed to deploy green hydrogen electrolysers.

Users of this innovation are hydrogen producers installing electrolysers, the Distribution Network Operator (DNO) and Distribution System Operator (DSO). There were several key learnings from the Discovery Phase around user needs, which influenced the detailed problem statements above. Barriers to deployment were also explored in Discovery and are noted in Q3 of this application. The project team comprises one of each type of users identified, and the project identified a specific site where the innovation will be trialled.

This project is complementary to two other SIF Discovery Projects being delivered by our Project Partner National Gas Transmission (NGT). The learnings from the three projects may align in a future Beta Phase project to be hosted at a single site.

Innovation justification

INNOVATION

· We believe that Connectrolyser is the first demonstration of electrolysers as dynamic assets to provide services to the electricity network, facilitated by flexible connection and advanced control systems.

Innovative aspects include:

· identifying how electrolyser developments could meet requirements to provide SoS services to networks, to take advantage of network capacity that exists but is currently only used during network fault conditions or planned outages. This untested approach goes beyond the existing connection products offered by GB DNOs, including flexible, curtailable, phased and timed connections.

· investigating the technical flexibility of PEM electrolysers and their ability to provide security services to the DNO and therefore access to cheaper, quicker connections.

· Developing a predictive control system to optimise the operation of a hydrogen hub to respond to signals from the network, make best use of renewable energy and deliver a secure supply of hydrogen to their customers.

DNOs are required to meet certain requirements to maintain SoS for all customers. The Engineering Recommendation P2 was revised and reissued in 2023. It now contains guidance for how networks could provide SoS from distributed generation and demand side services as well as the traditional solution of network assets.

CHALLENGES

Connectrolyser addresses all four SIF Challenges, but primarily Challenge 3: Improving energy system resilience and robustness. Development of local hydrogen hubs will improve energy system resilience and robustness as new hubs could become vital sources of DSO flexibility. Innovative approaches to connection and operation could improve network availability to new customers whilst maintaining electricity security.

ENGAGEMENT

From preceding innovation funded projects, we learned about predictive control, electrolyser impact to networks and generation constraints at the distribution level. In Discovery Phase, we engaged with Carbon Trust, HyCoRe (NGN) and REACT (SSEN-T) to share knowledge and avoid duplication. From these, we understand other issues that will impact electrolyser rollout such as water supply, hydrogen storage approaches and offshore development. We learned location-specific information from two related NGT projects, including engaging with potential offtakers, who are looking at the same demonstration site as Connectrolyser. We held in-person and online workshops to bring together experience of all parties involved to challenge our thinking.

· SIZE/FUNDING

· The project design ensures delivery within available timescales and focuses on the most beneficial customer outcomes.

· Green hydrogen production is relatively new. Due to the risk involved in the project and not fully knowing whether the learnings will lead to benefits can be delivered across UK Power Networks' licence areas, these activities would not form part of business as usual activities. In order to progress an innovative project which carries significant risk in implementation, additional innovation funding is required as a stimulus. The phased nature of the SIF suits this project better than NIA funding.

TECHNOLOGY READINESS

We expect the Connectrolyser control system to reach TRL2 ("Technology concept formulated") during Alpha Phase and progress to TRL7 ("System prototype demonstration in operational environment") during Beta. We also expect to reach Integration Readiness Level (IRL) 4 (from IRL1 currently) and Commercial Readiness Level (CRL) 4 (from CRL2 currently) by Alpha Phase completion.

· COUNTERFACTUALS

· The following have been considered:

· Total cost of national reinforcement for connecting hydrogen developments using conventional, non-flexible connection that add to overall peak demand.

· Costs for a specific hydrogen project to connect using a conventional, non-flexible, connection. Discovery Phase exemplar estimated £20m+ for an import/export connection.

· Connect using existing dynamic connection products (curtailable, phased, timed, profiled). These lead to reduced network reinforcement, but overall reinforcement requirement and associated delay in connection would still be high (Discovery Phase exemplar estimated £7.5m) for an import/export connection.

· Existing connection products and flexibility services suitable for connecting electrolysers.

Impact and benefits (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum for users of network services

Environmental - carbon reduction – direct CO2 savings per annum

Environmental - carbon reduction – indirect CO2 savings per annum

Revenues - improved access to revenues for users of network services

New to market – products

Impacts and benefits description

Modelling by Imperial Consultants during the Discovery Phase used the four Future Energy Scenarios (FES). The work indicates that national value of flexible hydrogen hub operation may be worth up to £30bn (Leading the Way FES scenario) in nationally avoided distribution network reinforcement, and around £1bn per year in frequency response to the ESO, by 2050. This will manifest as savings to all customers.

From the real-life hydrogen production example that underpins this project, the cost of providing a flexible connection is around £13m less than a firm connection. This is in line with the benefit of flex connection in RIIO-ED1 identified as being in the range of £2- 22m, reported annually in the E6 submission to Ofgem.

The Alpha Phase will be used to give greater granularity, refinement and validation on the size of the benefits.

Financial – Future reductions in the cost of network operation

Assessment of baseline in Discovery Phase indicated site connection cost of £20m+, much of which was network reinforcement to facilitate the connection. GB-wide value of flexible hydrogen hub operation may be up to £30bn in nationally avoided distribution network reinforcement by 2050. The attached CBA analysis, using System Transformation FES scenario, shows an NPV benefit of £313m over 30 years from deferring reinforcement costs.

Metrics will include:

· Capacity of network reinforcement deferred (MW and £)

Financial – savings per annum on bills for consumers

The change to connection fees as part of the Ofgem Significant Code Review means that reinforcement costs will be passed on to DUoS consumers. Reduction in required reinforcement will lead to reduced DUoS charges paid by consumers.

Renewable generators may experience less curtailment by being on flexible connections close to hydrogen hubs, thus enabling more hydrogen production and increasing revenues. We do not yet have a view on this value.

Metrics will include:

· Energy bills – current and future forecast (£)

Environmental – carbon reduction – Direct CO_2 savings/annum

Running the electrolyser responsively and improving network load factor may reduce losses and CO_2e on the electricity network. In Alpha Phase, it is proposed to study this impact. We do not yet have a view this value.

Metrics will include:

· Reduced losses (MWh)

Environmental – carbon reduction – Indirect CO_2 savings/annum

Hydrogen produced at the hydrogen hub would be used to replace fossil fuel consumption for off-takers who wish to fuel-switch. Some already identified are project participants in this SIF. For example, estimated CO_2 savings are estimated at up to 256.8tons of CO_2e per year.

In addition, reduced distribution-connected curtailment will lead to increased renewable generation on the system. Estimate for this is 1 ton of CO_2e per year.

Analysis during Discovery phase showed that dynamic hydrogen hub operation could lead to 60TWh reduced renewable (transmission-connected) energy curtailment per year.

Metrics will include:

· Carbon footprint of the solution with a comparison to baseline emissions. (TCO_2e)

· Avoided curtailment (MWh)

Revenues - improved access to revenues for users of network services

Learnings from deployment of Timed Connections are that a conservative average estimate of three months decrease per connection is appropriate.

Hydrogen hubs could also access additional revenue through offering flexibility services to the DSO. Revenue range for this is very variable, and hubs could earn £2-625k per year depending on location. These could be worth £1bn per year in 2050.

Metrics will include:

- Revenue from offering services to networks (£)
- Volume of hydrogen produced (kg)
- Revenue from hydrogen production (£)

New to market – products

Innovative connection products could lead to reduced reinforcement requirements, the value of which has already been noted above.

Metrics will include:

- Capacity of network reinforcement deferred (MW and £)

Teams and resources

The core project team will remain the same for the Alpha Phase, with no proposed changes or additions. The team in place during Discovery Phase worked very well together and is proven to bring together the wide range of experience and perspectives that the project needs.

ROLES AND EXPERIENCES

Project Partners

- UK Power Networks, electricity distribution network operator serving London, the East and the South East of England. UK Power Networks has established experience in innovating to develop new connections and flexibility products. These include the first flexible generation connections, timed connections and profiled connections. This project will follow the UK Power Networks' Innovation team's established internal governance. This is the same successful team that has delivered over £300m of benefits, won 39 industry awards and delivered over 75 projects since 2015.

- HydroGenus, industrial supply chain partner and hydrogen hub developer, bringing people with proven experience in hydrogen and a successful track record in the electricity and water industries. HydroGenus aims to become the leading UK developer for local production of low-carbon hydrogen by electrolysis. The executives have extensive experience in the electricity, hydrogen and water industries. HydroGenus leverages the team's experience in electricity and electrolyser markets and their longstanding relationships with a strong network of partners. HydroGenus' contacts also include hydrogen customers such as Element 2 who will offtake for transport refuelling and other customers who require hydrogen for industrial activities. HydroGenus' team members have a track record in assembling, leading and co-ordinating teams for multi-disciplinary projects such as is proposed in this bid.

- National Gas Transmission (NGT), seeking hydrogen to decarbonise the large gas fired compressors that are critical to the running of national pipelines. NGT have commenced an ambitious plan to provide a 100% hydrogen backbone to the UK by 2032 with further complementary work looking at blending across the wider network. NGT are committed to supporting the delivery of the Net Zero target of 2050.

Subcontractors

- Imperial Consultants (ICON), a specialist hydrogen, and electricity research-based consulting firm which is wholly owned by Imperial College London. Two specialty teams from ICON will support this project: the Electrical Engineering Group (Energy Systems team) and the Process Systems Engineering Group (hydrogen specialism).

· FES Services Ltd, bringing electrical system design and integration specialism.

· Some activities in the Alpha Phase will require additional support, specifically to assess the DCode in WP1 and develop technical documents in WP5. HydroGenus will identify suitable contractors over the summer so they can be secured for commencement of Alpha.

Participants

· A global manufacturer of advanced composite materials with a local site wanting to switch to low carbon hydrogen from natural gas.

ADDITIONAL NEEDS

For the Alpha Phase, there are no additional resources, equipment or facilities required.

THIRD PARTIES

There are no additional external parties, network users or consumers identified at this stage who are vital for the successful delivery of the project. The scope of work includes engagement and identification of a trial site. Whilst the Discovery Phase was based on a specific area in East Anglia, we believe it is appropriate to consider other locations before making a final decision ahead of Beta Phase. This part of the project will include important engagement with hydrogen consumers and possibly local residents and stakeholders. Their cooperation will be vital for the successful delivery of the project.

Project Plans and Milestones

Project management and delivery

The project has six work packages. More detail on each including milestones and deliverables is in question 8 and the Project Management Template, attached.

WP1: Analysis of DCode

WP2: Technical and commercial constraints

WP3: Hydrogen system requirements

WP4: Connectrolyser Design

WP5: Demonstrator Design

WP6: Engagement & Project Management

APPROACH

Project partner HydroGenus will be accountable for overall project management. The approach used in Discovery Phase was successful and will be replicated for Alpha Phase. This includes making use of the following tools and mechanisms to ensure successful project outcomes:

- An established weekly progress meeting agenda, to form the basis of project meetings.
- The risk register will be reviewed at all partner meetings
- Action tracker spreadsheet is used to keep track of actions, owners and agreed dates for resolution. To be managed by one person where practicable to ensure consistency.
- Gantt chart to be reviewed at each project meeting to compare progress with planned timescales.

The project has progressed through UK Power Networks' internal Innovation and Project Governance and Control Governance processes (SR 07 005i). This ensures that all the relevant internal stakeholders are fully engaged and formally committed to the project. UK Power Networks has a robust innovation procedure which led to benefits of over £330m across the RIIO-ED1 regulatory period. This project and any future Beta Phase will conform to the requirements which include robust stakeholder engagement, cost-benefit and carbon analysis. Regular monthly meetings will be held with a dedicated planning resource to support programme adherence, and mitigation of delays if any occur.

DEPENDENCIES

The Gantt chart shows the interrelationship and interdependencies between tasks and work packages. WPs 4-5 have dependency on WP1-3 and will therefore start after the first three work packages have concluded. The WPs have been structured in a logical way that ensures milestones are met in an efficient order. For example, work on the specification of Connectrolyser will follow clear understanding of DCode, technical and commercial constraints. For Beta Phase, it is proposed that Connectrolyser will be demonstrated on a commercial hydrogen hub being developed by HydroGenus separate from SIF. HydroGenus will ensure the projects run consistently.

RISKS

Risk management is an integral part of project arrangements. The project team will evaluate risks and implement mitigations weekly. The project risk register will be used to record and track risks and mitigations. For the first version see the completed Project Management template.

We have maintained our learning approach from our most recent project experience and have adapted project plan to allow time for contracting to take place. This is to ensure we have all project partners and suppliers fully signed-on and committed to the Project on terms acceptable to all project parties for prompt project initiation.

We propose a stage gate to take place towards the end of the Alpha Phase to determine whether to proceed with a demonstrator project at Beta Phase, and a mid-phase stage gate prior to the initiation of WP5. There will be a decision point at the end of WP1 to decide if a redundant capacity connection product ("N-0") is worth pursuing. If the decision is 'no', then this will be descoped from any future demonstrations of the innovation.

There are no supply interruptions planned as part of this project.

Key outputs and dissemination

ALPHA ACHIEVEMENTS

Through the Discovery Phase we have focused on feasibility, by refining the problem Connectrolyser is trying to solve and the value in solving it.

In the Alpha Phase our focus is on experimental development. We will seek to prepare and test the different solutions to the refined problems identified during the Discovery Phase. This is ahead of any future large-scale demonstrations in the Beta Phase where the focus moves to building and demonstration through the deployment of our solutions.

Our specific case success will be measured in terms of the updated benefits case together with the buy in that is achieved from key stakeholders: UK Power Networks as the DNO/DSO, HydroGenus as representatives of the hydrogen production and supply chain community, and National Gas and a global manufacturing company as end users of hydrogen and power. This is all supplemented through the credibility, experience and constructive challenge of consulting partners ICON and FES.

OUTPUTS AND RESPONSIBILITIES

The Alpha Phase will produce the following key outputs:

· WP1 (HydroGenus): Public report assessing how a hydrogen hub could provide SoS to electricity networks given stipulations in the DCode and associated documentation. It will contain a list of requirements on a hydrogen hub to deliver SoS service and any changes required to the DCode.

· WP2 (HydroGenus): A quantitative assessment of commercial and technical constraints to flexible operation of a PEM electrolyser.

· WP3 (HydroGenus and UK Power Networks): Specification for a hydrogen hub and a report covering the findings of network studies carried out by the UK Power Networks' Infrastructure Planning team. HydroGenus will lead the specification output.

· WP4 (HydroGenus): Specification and development plan for the Connectrolyser control system.

· WP5 (HydroGenus and ICON): Demonstrator execution plan and assessment report explaining the impact of scaling up approach UK-wide. HydroGenus will lead the demonstrator execution plan and ICON will lead the report.

· WP6 (HydroGenus and UK Power Networks): Engagement and project management. The key project management outputs will be presentations for IUK meetings, project plan, actions list and risk assessment. The key engagement outputs will be meeting again with all SIFs engaged with at the Discovery Phase, plus any additional that come to our attention through the Alpha Phase.

Some project outputs will have commercially sensitive information which will be redacted for external sharing.

Knowledge Dissemination

All our Alpha Phase projects will be uploaded to the Smarter Networks Portal and feature on the UK Power Networks' Innovation website with specific project learnings being disseminated at the IUK Show & Tell events. In addition, UK Power Networks will host an in-person event in London to disseminate the learnings and key outputs of all our successfully awarded Alpha Phase projects to a wider audience.

UK Power Networks will look to share project successes and discoveries via its social media channels with the possibility of publishing external media where appropriate.

Commercials

Intellectual property rights, procurement and contracting (not scored)

The parties agree to adopt the default IPR arrangements for this project as set out in Section 9 of the SIF Governance Framework.

The partners recognise that knowledge transfer is one of the key aims of the SIF, and that the benefits of this project will be maximised by the ability of other licensees to be able to learn from the Project so as to create improved outcomes or reduce costs for consumers. The partners anticipate that the Alpha Phase (or any potential subsequent phases) will result in the creation of IPR that can be freely disseminated and have no expectation of creating income streams or royalties from IPR outside of participation in a competitive marketplace for services that may be informed or stimulated via the outcomes of the project.

Commercialisation, route to market and business as usual

PLAN

There are two parts to the project that could progress to commercialisation independently of one another. One is the Connectrolyser control system, to optimise operation of a hydrogen hub. The other is a novel connection product which allows customers to access network capacity faster. The project has the potential to support competitive production of hydrogen by reducing barriers to entry with quicker and cheaper connections. The benefit of these two innovations to hydrogen producers is detailed in the Project Management Template and both innovations will be available to all users.

If value is demonstrated in the connection product, UK Power Networks will seek to update its connection policy, processes and supporting technology as necessary. It may be the case that changes to the DCode, and in particular Engineering Recommendation P2, are necessary to enable the novel connection prior to updates to UK Power Networks' internal documents.

The learnings and insight will be shared with other network operators so they may do similar. UK Power Networks' technical documents are freely available to external parties via the G81 technical library: Home - Document Library - UK Power Networks

READINESS

Responsibility for any further commercialisation of the Connectrolyser controller will rest with HydroGenus and the parties involved in developing it. All are established organisations with resources and funding available to progress, and all are demonstrating strong commitment to move forwards.

In support of the Beta Phase, HydroGenus has proposed a commercially funded umbrella project to run alongside and support Connectrolyser. This will facilitate the funding and deployment of the PEM electrolyser against which flexible connection will be demonstrated. The operation of the demonstration will be funded through Beta Phase.

This commercial project will also be used to facilitate two related National Gas SIF led projects looking at electrolyser efficiency through heat recovery and hydrogen storage.

SENIOR SPONSOR

In accordance with UK Power Networks' Innovation procedure, there has been senior sponsor involvement at key stages of the project. The senior sponsor, Director of Customer Service & Innovation, had the following involvement:

· Supported the Discovery Phase submission;

· Received updates on Discovery Phase and learnings;

· Helped shaped the Alpha bid; and

· Reviewed and approved this bid for Alpha stage funding.

The Discovery Phase had good engagement from the UK Power Networks' Low Carbon Technologies customer forum, which includes managers from the Connections, DSO and Asset Management directorates.

Policy, standards and regulations (not scored)

There are no specific regulatory or policy barriers as yet that may hinder the progress in the Alpha and Beta phases.

However, the flexible operation of electrolysers may be at odds with the Department for Energy Security and Net Zero Hydrogen Business Model (HBM) which is offering revenue support for hydrogen production. The model encourages maximum utilisation of deployed assets which leads developers to prefer a firm connection to the electricity network.

We believe that Connectrolyser will demonstrate that the whole system benefits possible from flexible hub operation are worth considering in the HBM. It could be the case that a model which encourages flexible operation could lead to speedier connections and quicker development of hydrogen hubs, helping meet Net Zero targets more quickly than the established model.

Learnings from this project will be shared with the Department for Energy Security and Net Zero to help develop policy going forwards.

The main barriers to innovation are:

· Accessing green hydrogen government subsidy to fund developments, and

· Producers' starting preference towards firm rather than flexible connections as they seek certainty and endeavour to maximise the production of hydrogen

With HydroGenus on board, we can draw on their ability to raise funds and show other developers/producers that this is a good way forward.

WP1 of the project will investigate a proposed novel connection approach and whether that would be compliant with the DCode. The project will assess the potential benefits of such an approach to connection before making any recommendations regarding future modifications to the DCode.

There are no other government policy changes which would need to occur for the project to progress into business as usual. As noted in question 10, UK Power Networks will update its connection policy, processes and supporting technology as necessary. There are no other standards which would need to change to progress into the next phase or business as usual.

Work Packages 1 and 2 have specific focus on better understanding the policy, standards and regulatory barriers to Connectrolyser progression. The project does not currently have any ongoing conversations with policymakers or agencies with oversight for regulation and enforcement.

This project does not anticipate requirement for any derogations or exemptions in any future phases.

Value for money

PROJECT COSTS AND CONTRIBUTIONS

The total Alpha Phase costs are £555,330 and the total SIF funding requested is £498,483 after considering Project Partner contributions. The project partners are contributing 10.2% of the total project costs, through contribution of reduced rates and/or uncharged time, which is more than the minimum 10% compulsory contribution. This demonstrates commitment to the project from partners as well as value for money to customers.

VALUE FOR MONEY

The project offers value for money for the consumer for the following reasons:

· The project has the potential to unlock up to:

o £30bn in benefits in avoided distribution network reinforcement by 2050,

o £1bn/year in revenue for hydrogen hubs providing frequency response to the ESO, and;

o 60TWh reduced renewable (transmission-connected) energy curtailment by 2030.

· The project is working with partner HydroGenus as they aim to set up a separate commercially funded umbrella project to raise funds to build an electrolyser that will be used to demonstrate the Connectrolyser innovation;

· Project tasks are defined concisely to achieve the project objectives through lean teams;

· The same partner organisations taken forward into Alpha Phase, with the same group of individuals leading the project, reducing time required to initiate project;

· Project Partners and subcontractors are experienced in the subject matter, allowing them to efficiently deploy their knowledge in the project;

· Project Partners are contributing resource at competitive market rates. The project findings are expected to offset the opportunity costs of the project participants who are unable to divert resources to other value enhancing core business opportunities;

· Unique to this project, Imperial Consultants are offering their bespoke network models and tools at no charge to help deliver the assessments around economic value, network readiness, and business case evaluations. Without these, much more resource would be required to complete project tasks that have been allocated to ICON for the Alpha Phase;

· Wherever possible, learnings from other projects will be deployed as summarised in Q3 of this proposal.

This project is complementary to two other SIF Discovery Projects being delivered by our Project Partner NGT. These other projects explore heat recovery from gas turbines for use in a specific type of electrolyser (Electrolyser Improvements driven by Waste Heat Recovery) and explore the potential for solid state hydrogen storage mediums (Hybrid Storage Systems for site safety and efficiency). The learnings from the three projects may align in a future Beta Phase project to be hosted at a single site.

Associated Innovation Projects

◉ Yes (Please remember to upload all required documentation)
○ No

Supporting documents

File Upload

Connectrolyser Show and Tell - ENA.pdf - 869.9 KB
Connectrolyser End of Phase - ENA.pdf - 829.7 KB
Connectrolyser Alpha_UKRI Mid Point Meeting_Jan 11 2024.pdf - 828.7 KB
SIF Alpha Round 2 Project Registration 2024-01-25 9_36 - 80.6 KB

Documents uploaded where applicable?

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