Strategic Innovation Fund (SIF)

Cycle 1 Innovation Challenges – Alpha and Beta Phases

Funding Decision and Summary of Recommendations from Expert Assessors

Date: 15 January 2025

Contents

Introduction

Innovation will prepare the regulated energy network companies to deliver Net Zero greenhouse gas emissions at the lowest cost to consumers, while maintaining world-class levels of system reliability and customer service.

The SIF was introduced as a part of the RIIO-2 price control by Ofgem, the Office of the Gas and Electricity Markets Authority, to support network innovations that contribute to reaching Net Zero while delivering real benefits to network consumers. The SIF is delivered in partnership with Innovate UK (part of UKRI), which administers the SIF and works to coordinate innovation activities funded by network consumers with other innovation funded programmes.

New Innovation Challenges are launched annually which focus on strategic issues currently facing gas and electricity networks.

The SIF adopts a three Phase Project approach to mitigate the risk associated with innovation: Discovery Phase, Alpha Phase and Beta Phase. The Discovery Phase focuses on feasibility, the Alpha Phase on experimental development, and the Beta Phase on deployment and demonstration.

As set out in the SIF Governance Document[1], the SIF is open to the Electricity System Operator, Electricity Transmission and Distribution, Gas Transmission and Gas Distribution licensees.

Starting in September 2024, the application and assessment process for the SIF changed. Instead of each Phase opening once a year, applicants can now apply for Discovery, Alpha and Beta funding three times a year.

This provides more opportunities to apply. At the same time, for the Discovery and Alpha Phases, the process of assessment for SIF funding has been shortened, and flexible Project start dates have been introduced.

[1] The SIF Governance Document can be found here: https://www.ofgem.gov.uk/publications/updated-sif-governance-document

The new application process has been designed to allow for more flexibility depending on Project needs. The application window opens every four months, for around four weeks at a time – opening at the end of January, end of May, and end of September. Applicants are able to apply across all Phases of SIF (Discovery, Alpha, and Beta) during each Application cycle, where eligible.

This report is for the Cycle 1 Alpha and Beta Phase Project Applications. It sets out the Funding Decision from Ofgem alongside the recommendations from independent Expert Assessors. Each Project Application was scored in accordance with eight Eligibility Criteria in accordance with the relevant Innovation Challenges and the SIF Governance Document.

The eligible Innovation Challenges for this Cycle are as follows.

Round 4 Alpha Phase[2] of the SIF was launched in September 2024 and focuses on four Innovation Challenges:

1. Faster network development
2. Greater heat flexibility
3. Embedding resilience
4. Accelerating toward Net Zero energy networks

Round 2 Beta Phase[3] of the SIF was also launched in September 2024 and focuses on four Innovation Challenges:

1. Supporting a just energy transition
2. Preparing for a net zero power system
3. Improving energy system resilience and robustness
4. Accelerating decarbonisation of major energy demands

[2] Find the four Innovation Challenges launched for Alpha Round 4 here: https://www.ofgem.gov.uk/decision/strategic-innovation-fund-round-four-innovation-challenges
[3] Find the four Innovation Challenges launched for Beta Round 2 here: https://www.ofgem.gov.uk/decision/strategic-innovation-fund-round-two-innovation-challenges

Round 3 Beta Phase[4] of the SIF was also launched in September 2024 and focuses on four Innovation Challenges:

1. Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout
2. Novel technical, process and market approaches to deliver an equitable and secure net zero power system
3. Unlocking energy system flexibility to accelerate electrification of heat
4. Enabling power-to-gas (P2G) to provide system flexibility and energy network optimisation

These Innovation Challenges were developed through extensive collaboration and consultation with a wide range of stakeholders and interested bodies, including energy network companies, other innovators and entrepreneurs, government and academia.

In prioritising these challenges, the key underlying principles established are that they should be:

- Strategic - innovations are required to meet national and devolved Net zero targets effectively.
- Network relevant - they involve innovation needs and solutions that can be taken forward or materially supported by energy networks.
- Timely - the challenge should focus on problem areas where solutions can be scaled up to meet the requisite Net Zero targets and commitments. 2035 was used as a target year for identifying challenges.
- Appropriate in scope - the scope of the Innovation Challenge complements and does not duplicate other UK innovation programmes (including other network innovation funding mechanisms).

[4] Find the four Innovation Challenges launched for Beta Round 3 here: https://www.ofgem.gov.uk/decision/strategic-innovation-fund-round-three-innovation-challenges

1 Cycle 1 Summary

Within each of the Innovation Challenges are specific requirements on scope and Project Partner requirements. Projects submitted to the SIF must meet these specific requirements and must follow the SIF Governance Document. For this Alpha Phase, Applications were received by 23 October 2024 and must start no earlier than 1 February 2025. They must last up to 8 months in total and must not request funding of more than £500,000, exclusive of VAT.

For this Beta Phase, Applications were received by 23 October 2024 and, must start no earlier than 1 February 2025, can last up to five years, and can request SIF Funding greater than £500,000. Prospective Beta applicants seeking more than £10,000,000 were required to provide justification to Innovate UK and Ofgem prior to the Beta Phase Application close.

Applications submitted to the Cycle 1 Alpha and Beta Phases by the 23 October 2024 deadline, and which met the Innovation Challenge-specific requirements, were assessed by Expert Assessors. The Expert Assessors are independent external appointees whose recommendations inform Ofgem's decision-making on the selection of Projects for SIF Funding. The Expert Assessors have relevant expertise and knowledge on the respective Innovation Challenges and/or the energy sector, including for example in policy, regulatory, commercial, financial and technical areas. Consistent with the requirements of the SIF Governance Document, the Expert Assessors have assessed each Application (a) with reference to its compatibility with the Eligibility Criteria in Chapter 2, and (b) taking into consideration any additional and relevant information available to the Expert Assessors.

As part of each Application assessment, the Expert Assessors also considered whether Projects should receive all the SIF Funding requested for the Alpha or Beta Phase, or no funding at all.

The overall funding recommendation summarised in this report is based upon a balance of considerations to take into account whether a Project has met each of

the SIF Eligibility Criteria, the suitability of the Project for SIF funding, any Project-specific conditions recommended by Expert Assessors, and wider concerns or opportunities identified by the Expert Assessors. For more information on how Projects are assessed by the Expert Assessors, please see Section 2, Assessment Process below.

This report is a consolidation of the Applications assessed by the Expert Assessors and sets out recommendations from the Expert Assessors to Ofgem on which Projects have met the Eligibility Criteria and should be considered for SIF Funding in the Cycle 1 Alpha and Beta Phases of the SIF. Ofgem, taking into the account the Expert Assessors' assessment and recommendations, will perform its own internal review of each Project to reach a decision. Ofgem is the sole decision-maker for the SIF.

2 Assessment Process

For the Alpha Phase there is a maximum of five stages to assess eligible submitted Applications:

- Initial sift - completed by Innovate UK to confirm whether an Application complies with the Innovation Challenge-specific requirements.
- Expert Assessor evaluation – Each Expert Assessor assesses and provides a score for each Application and its accompanying appendices, against the questions stipulated in the SIF Governance. These questions tie directly to the Eligibility Criteria outlined in chapter 2 of the SIF Governance Document. Each Expert Assessor includes their assessment of how and why an Application has met or not met each Eligibility Criterion and an overall comment for each Application assessed.
- Expert Assessors' overall recommendations – As part of their assessment, each Expert Assessor provides an overall recommendation on whether the Project should be considered for SIF Funding in the Alpha Phase. This decision is made based on an assessment on whether the majority of Expert Assessors consider that each of the Eligibility Criteria has been met and a consideration of any serious risk or opportunity in respect of an Application. A Project will be recommended for SIF Funding if it has a majority of Expert Assessors recommending it (two of the three Expert Assessors who assessed the Application), if no significant risks are identified which could prevent the Project from progressing, and if the majority of Expert Assessors on each Project consider it to have met each of the Eligibility Criteria outlined in chapter 2 of the SIF Governance Document.
- Recommended Project-specific conditions – Should an Expert Assessor identify an area for additional consideration or clarity for a Project recommended for SIF Funding during the Alpha Phase, the Expert Assessor may recommend a Project-specific condition be included. In many cases these have been offered as ways of strengthening the Project outcomes and their inclusion does not necessarily reflect a weakness in the Application. The recommended Project-specific conditions are then considered by Ofgem and finalised with any modifications in the Project Direction for each of the successful Projects.
- Final decision – The consolidated recommendations report is provided to Ofgem for consideration on which of the Projects for which Applications have been

made should be considered for SIF Funding. Having taken into account the Expert Assessors' report, the Authority decides which Projects should receive SIF Funding and provide brief commentary on its reasoning for each decision.

2.1 Meeting the SIF Eligibility Criteria

Projects submitted must meet all the Eligibility Criteria outlined in chapter 2 of the SIF Governance Document in order to be considered for SIF Funding. There are eight Eligibility Criteria which must be evidenced within an Application. The following table outlines how the scored questions tie with the Eligibility Criteria outlined in the SIF Governance Document.

Question number	Application question	Eligibility Criteria (chapter 2 of the SIF Governance Document)
1	Lead Network	(not scored)
2	Animal Testing	(not scored)
3	Solution statement and solution focus	Eligibility Criterion 1: Projects must address the Innovation Challenge set by Ofgem.
4	Innovation justification	Eligibility Criterion 1: Projects must address the Innovation Challenge set by Ofgem. Eligibility Criterion 3: Projects must involve network innovation. Eligibility Criterion 5: Projects must be innovative, novel or risky.
5	Impacts and benefits selection	Eligibility Criterion 2: Projects must have clearly identified potential to deliver a net benefit to gas or electricity consumers (whomever is paying for the innovation).
6	Impacts and benefits description	Eligibility Criterion 2: Projects must have clearly identified potential to deliver a net benefit to gas or electricity consumers (whomever is paying for the innovation).

7	Team and resources	Eligibility Criterion 6: Projects must include participation from a range of stakeholders.
8	Project management and delivery	Eligibility Criterion 8: Projects must be well thought through and have a robust methodology so that they are capable of progressing in a timely manner.
9	Key outputs and dissemination	Eligibility Criterion 4: Projects must not undermine the development of competitive markets.
10	Intellectual Property Rights (IPR), procurement and contracting	(not scored)
11	Commercialisation, route to market and business as usual	Eligibility Criterion 4: Projects must not undermine the development of competitive markets.
12	Policy, standards and regulations	(not scored)
13	Consumer impact and engagement	Eligibility Criterion 7: Projects must provide value for money and be costed competitively.
14	Value for Money	Eligibility Criterion 7: Projects must provide value for money and be costed competitively.
15	Associated Network Innovation Project(s)	(not scored)

3 Alpha Phase – Summary

In the Cycle approach, applicants have multiple opportunities throughout the year to apply to each Phase (Discovery, Alpha and Beta). Therefore, we anticipate times when some Phases and Innovation Challenges will not receive any applications.

For Cycle 1, two Projects submitted applications into Innovation Challenge 2, 'greater heat flexibility'.

No Applications were received for the other three Innovation Challenges covered by the Cycle 1 Alpha Phase.

Innovation Challenge	No. of Applications received
Faster network development	0
Greater heat flexibility	2
Embedding resilience	0
Accelerating toward Net Zero energy networks	0

This section covers the assessment of the Cycle 1 Alpha Phase Applications received into the 'greater heat flexibility' Innovation Challenge.

3.1 Alpha Phase
Innovation Challenge: greater heat flexibility - overview of Projects

For this Phase, two Applications were submitted to Innovate UK through the Innovation Funding Service (IFS) portal by the closing deadline of 23 October 2024 and are listed below.

Project reference number	Project name	Funding licensee	Total Project costs (£)	Total Project contribution (£)	Total SIF Funding requested (£)	Recommended by Expert Assessors for funding (Yes/No)	Decision by Ofgem for funding (Yes/No)
10145484	EqualLCT	Scottish Hydro Electric Power Distribution PLC	527,722	78,035	449,687	Yes	Yes
10145740	GeoGrid	Northern Powergrid Limited	481,227	48,292	432,935	Yes	Yes

3.2 Alpha Phase: Expert Assessors' Recommendations on Projects

3.2.1 Project 10145484 - EqualLCT

Submitted Project description
To meet the demand that heat pumps and other low-carbon technologies (LCTs) will place on the network significant reinforcement will be required; it is critical that the cost of scale of this is managed effectively. EqualLCT will accelerate the roll out of heat pumps combined alongside energy efficiency and flexibility products to facilitate the transition to net zero while also ensuring that peak heat demand is reduced, thereby reducing the levels of network reinforcement that would otherwise be needed. Attractive commercial offerings will facilitate the net zero transition, reduce bills for customers through reduced network reinforcement costs and in home energy efficiency.

Eligibility Criteria met or not met – Expert Assessors' evaluation		Additional justification
1: Projects must address the Innovation Challenge set by Ofgem.	Met	The Expert Assessors considered the Project to have addressed the Innovation Challenge as it is aiming to accelerate the adoption of energy efficiency and heat pump solutions to reduce long-term peak heat demand through market-led incentives driven by network need.
2: Projects must have clearly identified potential to deliver a net benefit to gas or electricity consumers	Met	The Expert Assessors considered this Project to have clearly identified potential to deliver a net benefit to gas and electricity consumers by reducing peak demand through the adoption of energy efficiency and heat pump solutions. In addition network reinforcement costs may

		be lowered, with part of this value being shared with consumers. However, the Expert Assessors raised concerns that the current approach to quantifying the value remains unclear. This can be addressed by a specific condition for the Project to clearly articulate the approach/ methodology for quantifying the value to consumers at regular intervals throughout the lifecycle.
3: Projects must involve network innovation.	Met	The Expert Assessors considered this Project to involve network innovation because firstly, it models the long-term benefits of increasing building energy efficiency for peak demand reduction, resulting in a novel dataset for the Local Energy Net Zero Accelerator (LENZA) tool; secondly, it examines the feasibility of new market incentives for consumers to help install energy efficiency measures and heat pumps.
4: Projects must not undermine the development of competitive markets.	Met	The Expert Assessors did not consider this Project to undermine the development of competitive markets because it encourages the participation of various technology providers and promotes a competitive marketplace for energy efficiency and heat pump technologies providers. However, the Expert Assessors noted that the Project Partner, Smart Metering Solutions (SMS), may have an unfair market advantage. Therefore, SMS should not be involved in designing the governance of the proposed market incentive and should not receive preferential terms in implementing energy efficiency or low carbon technology measures from the LENZA tool.

5: Projects must be innovative, novel and/or risky.	Met	The Expert Assessors considered the Project to be innovative and risky because no existing energy efficiency incentive today combines energy efficiency with heat flexibility to reduce long-term peak demand.
6: Projects must include participation from a range of stakeholders.	Met	The Expert Assessors considered this Project to include participation from a sufficient range of stakeholders to meet the Eligibility Criteria, as it involved key stakeholders such as DNOs, technology providers, local authorities, low-carbon technology suppliers, and a consumer advocacy group. However, the Expert Assessors suggested a specific condition that the Project should develop a clear plan to engage directly with consumers, rather than through representative organisations, to better capture consumer needs, ensure transparency, and facilitate future rollout.
7: Projects must provide value for money and be costed competitively.	Met	The Expert Assessors considered the Project to deliver value for money and be costed competitively because it exceeds the minimum match funding requirement, has reasonable costs for the industry, and the Project consortium aims to utilise learnings and experience from other SIF, NIA and other innovation projects. The Expert Assessors considered that the successful rollout of this Project could significantly improve the business case for investment in energy efficiency and low carbon heat for individual consumers, while also benefiting networks by avoiding unnecessary reinforcement.
8: Projects must be well thought through and	Met	The Expert Assessors considered the Project to have a robust methodology

have a robust methodology so that they are capable of progressing in a timely manner.		which gives confidence to the Expert Assessors that it will be capable of progressing in a timely manner because the project plan is clear, with appropriate time and resources allocated to achieve the deliverables and milestones. Risks are aligned with deliverables, and the team is well-placed to deliver each work package.

Recommendation to the Office of Gas and Electricity Markets (Ofgem)
FUND
The Expert Assessors agree that the Project has met all the Eligibility Criteria and recommends this Project for funding. The Project is strongly aligned with the Innovation Challenge, aiming to accelerate energy efficiency and heat pump adoption through market-led incentives and the development of a digital tool for implementation. Its potential to reduce peak heat demand and lower network reinforcement costs offers clear benefits for consumers, provided the methodology for quantifying these benefits is clearly articulated. The Project demonstrates significant network innovation by modelling the long-term benefits of energy efficiency and exploring new market incentives. The innovative dataset developed for the Local Energy Net Zero Accelerator (LENZA) tool and the feasibility study for market incentives reflect its novel approach. However, to ensure fairness, Smart Metering Solutions (SMS) should not influence market governance or receive preferential terms. The Project's innovative combination of energy efficiency and heat flexibility addresses long-term challenges. Its successful rollout could improve the business case for low-carbon investments while benefiting networks by avoiding unnecessary reinforcement. The Project provides value for money through competitive pricing, and strong collaboration among stakeholders enhances its value proposition.

While the Project engages a wide range of stakeholders, a direct consumer engagement plan is needed to ensure transparency and better capture consumer needs.

Additionally, the Project plan is robust, with clear milestones, allocated resources, and a capable team, providing confidence in timely and successful delivery.

Decision from the Office of Gas and Electricity Markets (Ofgem)
FUND
Ofgem agrees with the Expert Assessors and approves this Project for funding.

Recommended Project-specific conditions
At the kick-off meeting, the Funding Party must present to the Monitoring Officer a plan on how Smart Metering Solutions will not gain an advantage in a competitive market, through market governance or preferential treatment. Prior to the kick-off meeting, the Funding Party must present to the Monitoring Officer a stakeholder engagement plan on how the Project will directly interact with consumers, in addition to representative groups.

3.2.2 Project 10145704 - GeoGrid

Submitted Project description
The GeoGrid project explores the use of Geothermal Long Duration Energy Storage (LDES) to store renewable electricity as heat, with Leeds University as a trial site. LDES offers a cost-effective, scalable solution that will reduce constraint on the electricity networks. By storing off-peak electricity and discharging it during peak demand periods, LDES can lower curtailment costs, reduce network congestion, and enhance grid resilience. GeoGrid will assess the commercial potential of geothermal energy storage for both the trial site and nationally across GB to provide insights regarding its wider deployment, benefiting consumers with low-cost heat while supporting decarbonization and energy security.

Eligibility Criteria met or not met – Expert Assessors' evaluation		Additional justification
1: Projects must address the Innovation Challenge set by Ofgem.	Met	The Expert Assessors considered this Project to have addressed the Innovation Challenge because it demonstrates how increase in peak demands on the grid of heating as a result of heating decarbonisation can be mitigated using geothermal energy systems and heat networks. The Project will explore excess renewable generation coupled with inter-seasonal geothermal storage which could have a positive impact on electricity network resilience and reinforcement costs, which is consistent with the aims of the challenge.
2: Projects must have clearly identified potential to deliver a net benefit to gas or electricity consumers	Met	The Expert Assessors considered this Project to have clearly identified potential to deliver a net benefit to electricity consumers, firstly using geothermal energy systems as the energy source would result in lower emissions, thus providing environmental benefits. Secondly, there is potential for financial benefits from lowering curtailment costs of renewable energy, reduction in network congestion and enhancing grid resilience which could come from better use of cheaper electricity supply surplus and the avoiding of peak tariffs through geothermal heat storage.
3: Projects must involve network innovation.	Met	The Expert Assessors considered this Project to involve network innovation because it will demonstrate how the impact of heat decarbonisation, due to increased peak demands on the grid, can be mitigated using geothermal energy systems. Integrated geothermal energy

		systems are an innovation which could result in products and services not currently available within the GB energy system. The solution to be explored by the Project may address the significant network congestion and curtailment issues due to network constraints. This will result in the need to reduce electricity network reinforcements.
4: Projects must not undermine the development of competitive markets.	Met	The Expert Assessors did not consider this Project to be undermining the development of competitive markets because it aims to stimulate increased activity in geothermal system deployment, with a view to scaling up. This should increase competition as more of the heat demand is met through lower carbon electricity on the path to Net Zero. The Project is technology provider agnostic. Further stakeholder engagement as the Project progresses should mitigate risk in relation to the development competitive markets.
5: Projects must be innovative, novel and/or risky.	Met	The Expert Assessors considered the Project to be innovative and risky because it is integrating heat and flexibility services to utilise renewable geothermal energy. Implementation of a geothermal energy storage system as heat decarbonisation solution with flexibility benefits is considered novel. A range of factors contribute to the riskiness of the Project particularly including high geothermal drilling and connection capital cost. There are no known examples of large-scale heat network deployment using geothermal energy.

6: Projects must include participation from a range of stakeholders.	Met	The Expert Assessors considered this Project to have participation from an appropriate range of stakeholders because the skills and experience necessary to complete the Project are evident. The Project team includes flexibility and electrical system expertise, large scale heat pump designers/installers for district heating, thermal storage developers, and heat network providers. The involvement of the local area council is important, particularly with site selection for a Beta Phase.
7: Projects must provide value for money and be costed competitively.	Met	The Expert Assessors considered the Project to be costed competitively and delivering value for money as the split between Project Partners is consistent with their skills and work scope. Additionally, the use of the existing skills and capabilities, from the work which has already been done using the university and living lab, adds to the value for money.
8: Projects must be well thought through and have a robust methodology so that they are capable of progressing in a timely manner.	Met	The Expert Assessors considered the Project to have a robust methodology which gives confidence to the Expert Assessors that it will be capable of progressing in a timely manner. The work programme is clear, demonstrating that Project will be delivered via five work packages and the responsible owner (of each work package) has been identified. The Project Partners have worked together previously.

Recommendation to the Office of Gas and Electricity Markets
FUND

The Expert Assessors agree that the Project has met all the Eligibility Criteria and recommends this Project for funding.

The Project addresses the Innovation Challenge by demonstrating how increased grid peak demands from heating decarbonisation can be mitigated through geothermal energy systems and heat networks. This innovative approach integrates inter-seasonal geothermal storage with excess renewable generation, potentially enhancing electricity network resilience and reducing reinforcement costs.

The Project offers clear net benefits to electricity consumers by lowering emissions and providing financial savings through reduced curtailment costs, lower network congestion, and the avoidance of peak tariffs. These benefits are underpinned by leveraging surplus renewable electricity and geothermal heat storage.

This Project exemplifies network innovation by introducing integrated geothermal energy systems to address grid congestion and curtailment challenges, avoiding costly reinforcements. The solution is novel and technology-agnostic, stimulating competition in geothermal deployment and low carbon electricity solutions. Enhanced stakeholder engagement is recommended to ensure competitive market development.

The project does not undermine competitive markets but instead encourages greater geothermal system deployment, increasing competition by meeting heat demand with lower-carbon electricity. Its technology-agnostic approach supports market fairness, and further stakeholder engagement will mitigate risks to competitive market development.

While the Project is innovative and risky, particularly due to high geothermal drilling costs and a lack of large-scale precedents, the consortium includes experienced stakeholders in flexibility services, heat pump systems, thermal storage, and heat networks. The inclusion of the local council for site selection strengthens the Project's foundation.

The Project represents value for money, with Project Partners aligned to their expertise, leveraging existing skills and capabilities. A clear work programme with five well-defined

packages, experienced Project Partners, and robust planning instils confidence in timely delivery.

Decision from the Office of Gas and Electricity Markets
FUND
Ofgem agrees with the Expert Assessors and approves this Project for funding.

Recommended Project-specific conditions
Prior to the end of the Phase, the Funding Party must present to the Monitoring Officer how the Project has engaged with other Projects of a similar nature, e.g. the United Downs Deep Geothermal Power Project in Cornwall, and completed lessons learned to ensure shortfalls are not repeated. Prior to the kick-off meeting, the Funding Party must present to the Monitoring Officer a stakeholder engagement plan for the Project, focused on engaging with members of the public.

4 Beta Phase – Summary

As mentioned in the previous section, in the Cycle approach applicants have multiple opportunities throughout the year to apply to each Phase (Discovery, Alpha and Beta). Therefore, we anticipate times when some Phases and Innovation Challenges will not receive any applications.

This section covers Cycle 1, Round 2 and 3 Beta Phase Applications.

Round 2 Beta

No applications were received for the Round 2 Beta Innovation Challenges which were:

Innovation Challenge 1 - Supporting a just energy transition

Innovation Challenge 2 - Preparing for a Net Zero power system

Innovation Challenge 3 - Improving energy system resilience and robustness

Innovation Challenge 4 - Accelerating decarbonisation of major energy demands

Round 3 Beta

One Project submitted an application into Innovation Challenge 1, 'whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout'.

No applications were received for the remaining Round 3 Beta Innovation Challenges.

Innovation Challenge	No. of Applications received
Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout	1

Novel technical, process and market approaches to deliver an equitable and secure Net Zero power system	0
Unlocking energy system flexibility to accelerate electrification of heat	0
Enabling power-to-gas (P2G) to provide system flexibility and energy network optimisation	0

This section covers the assessment of the Cycle 1 Beta Phase Application received into the 'Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout' Innovation Challenge.

4.1 Beta Phase Innovation Challenge: whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout - overview of Projects

For the Beta Phase, 1 Application was submitted to Innovate UK through the Innovation Funding Service (IFS) portal by the closing deadline of 23 October 2024 and is shown below.

Project reference number	Project name	Funding licensee	Total Project costs (£)	Total Project contribution (£)	Total SIF Funding requested (£)	Recommended by Expert Assessors for funding (Yes/No)	Ofgem Decision for funding (Yes/No)
10145998	Artificial Forecasting	Northern Powergrid Limited	3,664,540	366,454	3,298,086	Yes	Yes

4.2 Beta Phase: Expert Assessors' Recommendations on Projects

4.2.1 Project 10145998 - Artificial Forecasting

Submitted Project description
As DNOs develop their distribution system operator functions, the current annual process used to forecast load at extra-high-voltage/high-voltage needs to become increasingly granular, at the monthly, weekly, daily and hourly level, to support flexibility dispatch and defer or avoid reinforcement. Moreover, the increasing prevalence of low-voltage monitoring data enables new use cases to support network planning and the extension of flexibility markets at ED3. The Artificial Forecasting project addresses these unmet needs by building innovative AI solutions to expand load forecasting capability at primary (EHV-HV) and secondary (HV-LV) substations, optimising flexibility procurement and enabling DSO functions across the sector.

Eligibility Criteria met or not met – Expert Assessors' evaluation		**Additional justification**
1: Projects must address the Innovation Challenge set by Ofgem.	Met	The Expert Assessors considered the Project to have addressed the Innovation Challenge because it looks to deliver a novel load forecasting tool with the potential to significantly change the approach to localised flexibility markets for the electricity system. This is aligned with one of the aims of the Innovation Challenge by using novel machine learning and artificial intelligence tools to increase responsiveness and system visibility through improved load forecasting. This will bring benefits to local

		and national flexibility provision by helping flexibility service providers (FSPs) conduct their role more effectively.
2: Projects must have clearly identified potential to deliver a net benefit to gas or electricity consumers	Met	The Expert Assessors considered this Project to have clearly identified potential to deliver a net benefit to consumers because enhanced forecasting on the week ahead timescale should allow more effective flexibility participation and utilisation. The potential for reducing uncertainty in the load forecasting means flexibility procurement would be more targeted and informed, in turn reducing the cost of distribution network operation for consumers. At the interview, the Expert Assessors also gained a greater understanding of the additional benefits of the solution around supporting delivery of a secure Net Zero power system; for instance in improving flexibility coordination and provision against a backdrop of significant activity, change, and infrastructure rollout across the network.
3: Projects must involve network innovation.	Met	The Expert Assessors agreed that the Project involves network innovation because it is looking to deliver a new, more accurate load forecasting solution which would enable new ways for the

		network to procure flexibility more dynamically.
4: Projects must not undermine the development of competitive markets.	Met	The Expert Assessors agreed that the Project does not undermine the development of competitive markets, instead seeing potential to enhance the operation, coordination, and competition within flexibility markets. This is due to the Project aiming to enable more granular time-based flexibility forecasts and procurement, which should allow for greater competition amongst flexibility service providers. The Expert Assessors did stress that strong and varied engagement with a range of FSPs is key to facilitating broader market development. A more robust approach to engaging with a broader range of FSPs is encouraged, and the Expert Assessors have recommended project specific conditions relating to stakeholder engagement.
5: Projects must be innovative, novel and/or risky.	Met	The Expert Assessors agreed that the Project meets this Eligibility Criterion and is innovative because it is leveraging machine learning models for load forecasting on the distribution network. The Expert Assessors gained clarity at interview on the clear extent to which this is risky, mainly in the significant

		uncertainty over the accuracy, speed, and impact of the final model. The scaling of the model across the Northern Powergrid network and the subsequent insights which can be generated from the clustering of sub stations was highlighted as a clearly risky element. Whilst the Expert Assessors noted that significant development of the models has been conducted in previous Phases, the clear need for further development work was articulated at the interview, for instance in integration of socioeconomic data as model inputs. The interview responses also demonstrated the clear case for artificial intelligence and machine learning in the tool, and the novel nature of their application in this problem space. The Expert Assessors were satisfied with the interview responses on how this approach is innovative and novel compared with other approaches DNOs are taking to forecasting for flexibility procurement on the day-ahead and week-ahead horizon. Continued and more proactive engagement with the other DNOs is strongly recommended by the Expert Assessors during the Beta Phase.
6: Projects must include participation from a	Met	The Expert Assessors considered this Project to include participation from a

range of stakeholders.		sufficient range of stakeholders because relevant flexibility service providers operating across markets, machine learning specialists, and a distribution network operator are present in the consortium. The Expert Assessors noted that the responses of the FSP Project Partners in the interview indicated that they were well engaged and have fed into the planning and steering of the Project. The Expert Assessors did note that they would like to see a more proactive and structured stakeholder engagement approach, particularly including other Distribution Network Operators, the Central Market Facilitator, the National Energy System Operator (NESO), and additional FSPs.
7: Projects must provide value for money and be costed competitively.	Met	The Expert Assessors considered the Project to be delivering value for money and be costed competitively because of the appropriate costs outlined and the strong forecasts for payback, added value and deferred investment costs. The Expert Assessors did note that the Project should continue to consider how the Project sits in the broader portfolio of forecasting and flexibility approaches by Northern Powergrid; in particular considering scope for more systematic and strategic use of the Artificial Forecasting tool and insights,

		which could unlock additional value and benefits.
8: Projects must be well thought through and have a robust methodology so that they are capable of progressing in a timely manner.	Met	The Expert Assessors considered the Project to have a robust methodology which gives confidence to the Expert Assessors that it will be capable of progressing in a timely manner because the Project plan is well developed, with clear expertise and experience across the Project Partners. The stage gates are well defined and placed to mitigate points where significant risks exist. The Expert Assessors noted that there was strong cooperation and synergy across the Project Partners during the interview. The Expert Assessors noted that the stage gates are logically timed and provide strong assurance against the uncertainty at key milestones of the Project.

Recommendation to the Office of Gas and Electricity Markets (Ofgem)
FUND
The Project is recommended for funding as it aligns with the Innovation Challenge by aiming to deliver a novel load forecasting tool that could significantly improve localised flexibility markets for the electricity system. By leveraging advanced machine learning and artificial intelligence, the project seeks to enhance system visibility and responsiveness, benefiting flexibility service providers (FSPs) and enabling more effective participation in flexibility markets.

The Project demonstrates clear potential to deliver net benefits to consumers by reducing uncertainty in load forecasting, leading to more targeted and cost-effective flexibility procurement. This would lower the cost of network operations while supporting the transition to a secure net zero power system. The innovative use of machine learning for distribution network load forecasting, alongside the integration of socioeconomic data and clustering of substations, underscores the project's novel approach and potential for transformative impact, though some risks remain regarding the accuracy and scalability of the models.

The Project does not undermine the development of competitive markets within flexibility markets by enabling more granular time-based forecasts and procurement, enhancing coordination and reducing barriers for FSPs. However, the project should adopt a more structured and proactive engagement strategy to involve a broader range of stakeholders, including other Distribution Network Operators (DNOs), the Central Market Facilitator, the National Energy System Operator (NESO), and additional FSPs, to maximise market development and collaboration opportunities.

The Project includes a range of stakeholders by involving a robust consortium of relevant stakeholders, including FSPs, machine learning experts, and a DNO, who have demonstrated strong collaboration. While the Project is costed competitively with a clear value for money proposition, continued efforts should focus on aligning the tool within Northern Powergrid's broader forecasting and flexibility strategies to unlock further benefits.

The Project methodology is robust, with a well-defined plan, clear milestones, and a capable team. Stage gates are strategically placed to mitigate risks at critical points, ensuring the project progresses in a timely and efficient manner. The synergy among Project Partners provides additional confidence in successful delivery.

Decision from the Office of Gas and Electricity Markets (Ofgem)
FUND
Ofgem agrees with the Expert Assessors and approves this Project for funding. The Project addresses the Innovation Challenge by developing a novel load forecasting tool

using machine learning and AI to improve system visibility and flexibility market efficiency, benefiting consumers through reduced costs.

The Project fosters competition by enabling granular, dynamic forecasting and increasing opportunities for flexibility service providers (FSPs). Ofgem concurs with the recommendation for broader stakeholder engagement, including other DNOs, NESO, and FSPs, to enhance market development.

The Project demonstrates value for money with robust methodology, logical stage gates, and strategic alignment with Northern Powergrid's broader approaches. Subject to stakeholder engagement improvements and further model development, the Project is well-positioned to deliver innovation and consumer benefits.

Recommended Project-specific conditions

As part of the quarterly review meetings, the Funding Party must present to the Monitoring Officer a stakeholder engagement plan on how the Project intends to encourage use of the platform by other DNOs, NESO, the Central Market Facilitator and additional FSPs.