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Network Innovation Competition 2017 Funding Decisions

Decision

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Overview:

We run two annual Network Innovation Competitions (NICs), one for gas and one for electricity. The NICs are designed to stimulate innovation in the energy networks. Through the gas and electricity NICs, network companies can apply for funding to deliver innovative Projects which have the potential to provide benefits to energy customers. This document explains which Projects we have selected for funding this year.

This was the fifth year of the NICs and there were ten applications for funding across both competitions. We have selected two gas Projects and five electricity Projects for funding under the NIC. These decisions are consistent with the recommendations of our independent Expert Panels. We propose to award £57.6 million to these Projects. Licensees must make at least a ten per cent contribution to the costs of Projects. This year licensees and their partners will provide £9.9m.

The successful Projects trial innovative practices and new technologies. They have been selected because they will help Network Licensees to understand how to meet customers' changing requirements as Great Britain moves towards a low carbon economy.

Context

Network companies have a fundamental role in supporting the delivery of a low carbon economy while contributing to maintaining safe, secure and reliable energy supplies at long-term value for money to consumers. Innovation is crucial to meeting these outcomes by changing what is considered 'business as usual' and enabling a more rapid pace of change in the sector.

Network companies will need to innovate in the way they design, plan, and operate their networks, while delivering the services that customers want. The NICs are designed to help stimulate this innovation. They provide up to £90 million of funding each year to encourage Network Licensees to run trials of new technology and different commercial and network operating arrangements.

Network operators will gain knowledge from these trials, which they will then be able to apply to the specific challenges they face. This should bring environmental benefits as well as cost savings to energy customers in the future.

Associated documents

NIC Governance Documents
https://www.ofgem.gov.uk/publications-and-updates/version-30-network-innovation-competition-governance-documents

Contents

Executive Summary

The NICs encourage network companies to innovate in the design, development and operation of their networks and to engage with third parties in doing so. The gas NIC provides up to £20 million of funding each year and the electricity NIC provides up to £70 million of funding each year for a small number of large-scale innovation Projects.

This document contains our decisions on which Projects will receive funding in the fifth year of the NIC. We received three submissions to the gas NIC and seven submissions to the electricity NIC requesting a total of £81.1 million of the £90 million available funding. We have selected two gas Projects and five electricity Projects for funding.

The table below gives a brief overview of the aims of the successful Project and the maximum amount of NIC funding available for each Project.

2017 Gas NIC Projects	**NIC funding awarded**
H21 The Project aims to demonstrate that it is safe to transport 100% hydrogen in the gas distribution networks. The evidence produced could be used to support the case to decarbonise heat by converting the GB gas networks from natural gas to hydrogen. *Proposed by Northern Gas Networks (NGN)*	£8.9m
Robotic Roadwork and Excavation System (RRES) The Project aims to develop a Robotic Roadworks & Excavation System, which will use advanced robotics to lower the cost and improve the efficiency, safety and environmental impact of utility street works. *Proposed by* SGN	£6.3m

2017 Electricity NIC Projects	NIC funding awarded
Active Response This Project builds on learning from previous innovation Projects to address constraints to the uptake of low carbon technologies. It will develop and trial advanced automation and power electronic devices for use on the distribution network that should reduce the amount of reinforcement that is needed. *Proposed by UK Power Networks (UKPN)*	£13.8m
Electricity Flexibility and Forecasting System (EFFS) This Project will develop and trial a load forecasting tool to identify long and short term need for flexibility services and where it may be possible to provide these services. *Proposed by Western Power Distribution (WPD)*	Up to £2.9m
Fusion This Project will trial a market framework called the Universal Smart Energy Framework. The Project aims to demonstrate an approach for DNOs to harness flexibility to manage networks. *Proposed by SP Energy Networks (SPEN)*	Up to £5.3m
LV Engine This Project will develop and trial 'Solid State Transformers' on the network. Using these SPEN aims to make better use of capacity within existing low voltage distribution networks to facilitate the increasing uptake of Low Carbon Technologies. *Proposed by SP Energy Networks (SPEN)*	£7.3m
Transition This Project will design and demonstrate some of the tools needed to deliver the market models being considered by the Open Networks Project. *Proposed by Scottish and Southern Electricity Networks (SSEN)*	Up to £13.1m

We assessed each of the Project proposals against the evaluation criteria set out in the NIC Governance Documents.[1] In reaching the decision whether to fund Projects we were advised by two independent Expert Panels.

The gas NIC Expert Panel has only recommended providing partial funding for the H21 Project. We agree with the Expert Panel's recommendation that funding should only be provided for the initial phases of laboratory testing. We have not been convinced that it is critical to fund the proposed field trials at this time. We think that the field trials could be better scoped, and provide greater value for money, once there is more information available and there has been further thinking about potential future live trials.

We plan to place additional conditions on the EFFS, Fusion and Transition Projects. We will require the licensees proposing these Projects to collaborate to identify areas of unnecessary duplication. The revised Projects will need to be endorsed by the Energy Networks Association's (ENA's) Open Networks Project Steering Group and approved by Ofgem prior to being implemented. The relevant licensees will need to make submission to us within six months of us issuing each Project Direction. In

[1] Our Governance Documents and criteria have been formulated in line with our principal objectives and general statutory duties.

these submissions licensees will need to explain how areas of overlap will be removed and how they will coordinate the work streams of the three Projects. This means that the final funding provided for these Projects could be lower than that stated above but it will not increase.

The knowledge gained from these Projects should be made available to all parties who have an interest in the future development of markets for flexibility. However, our decision to provide funding for these Projects should not be seen as an indication of any future decisions regarding the arrangement of markets for flexibility.

In December 2017 we will issue successful licensees with a Project Direction. These explain the terms they will have to comply with for each Project as a condition of receiving NIC funding. The licensees will have to comply with this document before the Projects can progress.

1. Introduction

Chapter summary
In this chapter, we describe the background, structure and process of the NICs, including how we and the Expert Panels have evaluated the Projects.

Purpose of this document

1.1. This document explains our decisions on the applications we received to the fifth year of the NICs.[2] We assessed the Projects against the evaluation criteria in the NIC Governance Documents[3], as well as against our principal objective and our wider statutory duties.

1.2. We have published other documents alongside this decision. These are:

- The Full Submissions for each NIC Project, produced by the network companies.
- The Expert Panels' recommendation reports on which Projects to fund.
- The network companies' answers to questions raised by us, the independent technical consultants (who evaluated parts of the Projects) and the Expert Panel during the process.

How the NICs work

1.3. The NICs encourage network companies to innovate in the way they design, develop and operate their networks. They provide funding for a small number of large-scale innovation Projects. We run two annual competitions which provide up to £20 million of funding for gas Projects and up to £70 million of funding for electricity Projects.

1.4. The NIC Governance Documents sets out the scheme's governance and administration.

Initial Screening Process

1.5. The annual competitions start when network companies submit Project proposals in the Initial Screening Process (ISP). The gas NIC is open to applications from gas distribution networks (GDNs), the gas transmission licensee – National Grid Gas Plc (National Transmission System) (NGG NTS), and independent gas transporters. The electricity NIC is open to applications from the fourteen electricity distribution licensees (DNOs), the onshore electricity transmission licensees

[2] This document constitutes both notice of and reasons for our decision as required under section 38A of the Gas Act 1986 and Section 49A of the Electricity Act 1989.
[3] https://www.ofgem.gov.uk/publications-and-updates/version-30-network-innovation-competition-governance-documents

(TOs/SO), the offshore transmission owners, and independent distribution network operators (iDNOs).

1.6. During the initial screening process (ISP), we consider whether proposals are eligible for funding based on the requirements set out in the NIC Governance Documents (including low carbon or environmental benefits and value for money for customers). Only eligible Projects may progress to the Full Submission stage.

Full submission stage

1.7. At the Full Submission stage, we appoint an independent Expert Panel to advise us on whether to provide NIC funding.[4] The Expert Panels consist of people with specific Expertise in the energy networks, environmental policy, technical and engineering issues, economics and finance, and consumer issues. The Expert Panels assess each Project against the evaluation criteria set out in the NIC Governance Documents – The Expert Panel base their recommendation on the extent to which a Project:

- Delivers environmental and financial benefits.
- Provides value for money to customers.
- Generates knowledge that can be shared amongst all Network Licensees.
- Is innovative.
- Demonstrates a robust methodology and readiness of the Project.
- Involves other partners and external funding.
- Is relevant and timely.

1.8. After they have completed their evaluation the Expert Panels each produce a report (published alongside this decision) on which Projects they think we should award funding to. These reports inform our decisions on which Projects to fund. However, our decisions on which Projects to fund may, in practice, differ from the Expert Panels' recommendations.

[4] The biographies of the Expert Panel can be found here: https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/gas-network-innovation-competition/gas-nic-expert-panel

The 2017 competitions

1.9. This year's competitions began with the ISP in April 2017. We received eleven submissions across both competitions. We rejected one submission to the gas NIC at the ISP stage; Wales & West Utilities' New Nwy (New Gas) submission.[5]

1.10. At the Full Submission stage of the competition each Expert Panel reviewed the relevant network companies' submissions. Each Expert Panel had two meetings with each Project team in the course of their evaluations. Where aspects of the submissions required clarification, the network companies had an opportunity to resubmit their proposals. The Expert Panels made their recommendations based on the final submissions and submitted their recommendations to us in late October 2017.

1.11. We appointed Frazer-Nash as the technical consultants for this year's gas competition. We appointed Jacobs as the technical consultants for this year's electricity competition. The role of the technical consultants is to support the Expert Panel. The consultants attended most of the meetings during the process, including all the meetings that the Expert Panel had with the companies. The consultants were directed by the Expert Panel to advise, and challenge, the companies on specific technical aspects of each Project. We, the consultants, and the Expert Panel also asked questions of the companies throughout the process.

1.12. We assessed the Projects, taking into account the Expert Panels' recommendations and the evaluation criteria, to decide which Projects should receive funding. Our decision on which Projects to fund through the Gas NIC is contained in Chapter 2. Our decision on the electricity NIC is contained in Chapter 3.

1.13. We have published the Expert Panels' recommendation reports, the Full Submissions, and the written questions and answers alongside this document.

[5] The New Nwy (New Gas) project did not meet the value for money evaluation criterion at the ISP stage because we did not think a substantive amount of the learning could be applied directly by gas network operators. Our full decision and reasoning is available here: https://www.ofgem.gov.uk/publications-and-updates/decision-new-nwy-new-gas-submission-initial-screening-process-2017-gas-network-innovation-competition

2. Decision on Gas Network Innovation Competition

Chapter Summary

We have decided to fund two of the gas NIC Projects. This includes full funding for the Robotic Roadworks and Excavation System Project, and partial funding for the H21 Project. In total, we are approving just over £15 million of funding. We have decided not to fund the Tain Innovative Gas Grid Project.

2.1. We received three submissions to this year's gas NIC requesting a total of £21.8m of NIC funding:

- SGN requested £6.3m for the Robotic Roadworks and Excavation Project that aims to use advanced robotics to automate and improve the utility excavation process.
- NGN requested £13.3m for the H21 Project which aims to provide safety evidence on whether the GB gas distribution networks are suitable to transport 100% hydrogen.
- Fulcrum Pipelines Ltd requested £2.1m for the Tain Innovative Gas Grid Project which aimed to deliver Compressed Natural Gas (CNG) and bio-methane to a remote town in Scotland via a new standalone network.

Our Decision

2.2. Based on the evidence provided by the network companies, and the Expert Panel's recommendations, we have decided to:

- Fund the Robotic Roadworks and Excavation System Project as submitted.
- Award partial funding to the H21 Project to fund Phases 1A and 1B of the Project. We have decided not to award funding for Phase 2 of the Project. This is to ensure value for money for customers.
- Not award funding to the Tain Innovative Gas Grid Project.

2.3. Below we summarise the reasons for our decisions. The Expert Panel's report, published alongside this document, provides its assessment of each Project against the NIC evaluation criteria and should be read alongside this decision document. We broadly agree with the Expert Panel's assessment of all the Projects and its reasons and recommendations on which Projects to fund.

Projects selected for funding

Robotic Roadworks and Excavation System (RRES) – SGN: NIC funding awarded £6.3 million, other funding £0.9 million

Overview

2.4. The RRES Project aims to develop advanced robotics for use by gas network operators when carrying out excavations, for example during a repair or replacement of a gas main. RRES looks to lower the costs of excavations, as well as improve excavations' efficiency, safety and environmental impact. It will be applied to both rural (transmission) and urban (distribution) areas, and will use below-ground locating sensors, computer vision and "soft-touch" excavation tools to prevent damaging neighbouring utilities as well as the target asset.

Summary

2.5. The Expert Panel recommend that we fund this Project. It considers that RRES has the potential to provide significant environmental and financial benefits to gas consumers by reducing the time needed for street works.

2.6. In addition, the Expert Panel considers that SGN has chosen a strong Project partner (ULC Robotics) that has a good track record in similar Projects. This gives the Panel confidence that the Project stands a good chance of success. The Expert Panel notes that although there is a risk that the full objectives of the Project might not be met due to the complexity of the Project, the Project plan has been developed to deliver incremental learning even if the ultimate goal is not achieved. The Expert Panel therefore considers that aspects of the solutions developed throughout the Project, such as the development of below-ground sensors or improvements to excavation tooling, will provide substantial benefits for gas consumers, even if the full objectives are not realised.

Assessment and decision

2.7. We agree with the Expert Panel's recommendation and consider that the RRES Project performs well across all of the evaluation criteria.

2.8. The Project performs well under the financial and environmental benefits evaluation criterion. If successful, the Project is forecast to reduce carbon emissions by 138,000 tonnes CO_2e by 2050 through reducing vehicle movements and the amount of cement used to refill the excavated area. SGN also estimates that the Project could lead to financial savings of £590 million by 2050, for example by increasing the applicability of core-and-vac technology, and reducing the accidental damage to buried assets. These benefits will increase if the technology is adopted by other utilities.

2.9. Based on the potential benefits described above, we consider the Project is good value for money for gas customers. SGN estimate that the total benefits to GB gas consumers amount to £26 million over the RIIO-GD2 period.[6] ULC Robotics' financial contribution of £200,000 also strengthens the value for money of this Project by enabling some additional sharing of the costs.

2.10. This Project will generate knowledge that will be relevant to all the Network Licensees as well as other utilities that carry out excavations for maintenance and repairing underground assets. The knowledge dissemination plans within SGN's submission show that learning will be shared effectively, including the DNOs and other utilities, as well as the other GDNs. The Project meets the default Intellectual Property Rights arrangements and any royalties that SGN receives from the rollout of the RRES system will be returned to consumers in proportion to their funding.

2.11. The RRES Project is innovative. It aims to develop and integrate different operational tools into a single robotic prototype RRES system. The Project requires changes to current processes and has an ambitious scope with complex technical challenges, so we are confident that it would not be carried out as part of business as usual. Despite the ambitious Project plan and the risks associated with these technical challenges, we are satisfied that learning and benefits will accumulate throughout the three-year Project, even if the full objectives are not achieved.

2.12. ULC Robotics proposed the RRES Project through an SGN call for ideas. We consider ULC Robotics to be a good choice of Project partner due to their Expertise in robotics and good record of delivery in other NIC and NIA Projects. We also think the engagement with the UK Manufacturing Technology Centre will be beneficial to the Project.

2.13. The learning from the RRES Project is relevant and timely as utilities face an ongoing challenge in safely managing excavation activities. The Project was preceded by a feasibility study and a technology review funded through the NIA to guide the Project development and ensure it could be started in a timely manner. We were also satisfied that the Project had developed a suitable Project plan.

2.14. Based on the above rationale, we will provide £6.3m in NIC funding to RRES.

H21 – Northern Gas Networks (NGN): NIC funding awarded £8.9 million (£13.3 million requested), other funding £1.3 million

Overview

2.15. The H21 Project aims to provide quantified safety evidence on whether the GB gas distribution networks are suitable to transport 100% hydrogen. The evidence produced aims to provide knowledge of the network assets and it could be used to

[6] Calculated assuming an average Information Quality Incentive (IQI) sharing factor of 35% and an eight-year price control period.

inform a future decision (eg by Government) on whether the GB gas network should be converted to transport 100% hydrogen.

2.16. The Project proposes three phases: Phase 1A would confirm potential changes in the background leakage levels, Phase 1B would confirm any changes to the safety risk, and Phase 2 would undertake field trials on a disused part of the network.

Summary

2.17. The Expert Panel consider that the laboratory tests in Phases 1A and 1B of the Project are relevant and timely to inform a potential Government policy decision on the future of heat. The Department for Business, Energy and Industrial Strategy's (BEIS) 'Clean Growth Strategy'[7] highlighted hydrogen as a potential pathway for decarbonisation in the UK. However, tests need to be completed to evidence whether the existing gas network can safely and cost effectively transport 100% hydrogen. This is a key challenge that needs to be overcome to assess the viability and cost effectiveness of using hydrogen for heat. The Panel thinks that the Phase 1A and 1B testing will provide evidence of the safety of using hydrogen on distribution network assets and therefore are on the critical path for Government decisions on decarbonisation.

2.18. The Panel also think that the evidence from Phases 1A and 1B could inform the networks' ongoing maintenance strategies to ensure future repairs and replacement equipment are carried out with potential future hydrogen use in mind. As such, it considers Phases 1A and 1B offer value for money to consumers and generate significant learning for both the Network Licensees and Government. The Expert Panel recommend funding the £8.9 million associated with Phases 1A and 1B of the Project.

2.19. However, the Expert Panel has reservations about the value for money, relevance and timeliness of the Phase 2 field trials proposed under H21. BEIS has proposed running a consumer trial of hydrogen in the future, subject to the outcome of initial testing, including the H21 Project. However, the details of this potential live trial are yet to be determined. The Panel thinks this potential live trial is very different to the field trials proposed in Phase 2 of the H21 Project and considers it too early for field trials to be on the critical path. It argues that after the completion of Phases 1A and 1B there is time to decide if Phase 2 is required to build a safety case, in discussion with the Health and Safety Executive (HSE). It thinks that not all parts of the existing distribution network will need to be tested for compliance before a consumer trial, so any field trials should be designed once there is more evidence. The Expert Panel therefore do not recommend funding the £4.4 million associated with Phase 2 of the Project.

[7] https://www.gov.uk/government/publications/clean-growth-strategy

Assessment and decision

2.20. We agree with the Panel that sufficient benefits will accrue to gas customers through learning about the network assets from Phases 1A and 1B to contribute funding to this part of the Project. We also agree it is relevant and timely to carry out the Phase 1A and 1B tests to help understand the potential future use of hydrogen for heating. Additionally, the evidence provided will complement a £25 million Project funded by BEIS that aims to develop and test domestic and commercial hydrogen appliances.[8]

2.21. We also agree with the Expert Panel that there is not enough evidence to justify that Phase 2 offers gas consumer's value for money at this stage. The Phase 2 trials outlined in the H21 Project were extensive and we do not think these have been justified as value for money or timely at this stage. It is not clear that it is in the interest of consumers to proceed with Phase 2 now when none of the learning from Phases 1A, 1B and the BEIS funded programme testing hydrogen appliances is currently available. It is possible that Phase 2 would be better designed once further evidence from the earlier stage Projects is available, and when the potential future live trials have been scoped. This could result in more informed testing than the Phase 2 trials proposed by the Project.

2.22. The H21 Project team and BEIS have suggested the Phase 2 field trials are required to inform the potential live consumer trials. However, as a date and location for the live trials has not been committed to yet, there is not enough evidence to convince us that it is critical for gas consumers to fund the field trials now.

2.23. Based on our assessment above, we do not believe Phase 2 of the H21 Project meets either the value for money; or the relevant and timely evaluation criteria. We have decided not to award funding for this stage of the Project. However, we agree with the Expert Panel that Phases 1A and 1B meet all the evaluation criteria and should be funded. We agree that it is sensible to start testing the viability of using 100% hydrogen in the GB gas distribution networks to inform thinking on the long-term future of heating and the use of the gas networks.

2.24. Our assessment of the Project against the remaining criteria is outlined below.

2.25. The carbon and financial benefits case within the H21 bid is based on the roll out of 100% hydrogen rather than benefits the Project itself will deliver. The delivery of these benefits cannot be realised by this Project alone and will require Government policy decisions, further trials, tests and expenditure.

2.26. We are aware that the future path to decarbonisation is uncertain, and that 100% hydrogen is a potential pathway that could provide benefits to consumers. We are also aware that some recent studies have argued that 100% hydrogen is a lower

[8] https://www.gov.uk/guidance/innovations-in-the-built-environment

cost pathway than other alternatives.[9] While we consider that the future path for decarbonisation is uncertain, we think it is worth exploring 100% hydrogen further alongside other options in order to better understand the implications. We agree with the Panel that the Project could also deliver benefits through generating new learning about the compatibility of the network with hydrogen, which can inform ongoing maintenance and repair work. We are therefore satisfied that the H21 Project meets the environmental and financial benefits evaluation criterion.

2.27. Testing the compatibility of the gas distribution network assets with 100% hydrogen is innovative and has not been done before in GB. This Project aims to develop the current understanding of transporting hydrogen in gas network assets and it will help inform the feasibility of converting the GB gas grid to 100% hydrogen. We have carefully considered whether the Project meets the NIC Technology Readiness Level (TRL) criteria[10] and we are satisfied that H21 starts at TRL 4 – a development activity to validate the transportation of 100% hydrogen within the GB gas distribution network. However, we do not agree with the TRLs included in the submission[11], which we thought were too high. For example, we don't think the Phase 2 field trials on a disused part of the network constitute a full-scale demonstration in a working environment so do not agree the Project will finish at TRL 8. We envisage TRL 8 to be a full live trial. We think that Project team should have been clearer in justifying its assessment of the Project TRL.

2.28. We are pleased that all four GDNs are Project partners and that they are working collaboratively in this area to avoid duplication. We also think the choice of DNV GL and the Health and Safety Laboratory as Project partners strengthens the Project due to their technical Expertise. These organisations will be well positioned to carry out the testing in Phases 1A and 1B.

2.29. Phases 1A and 1B of the Project have a technically robust methodology, with a detailed Project plan and experienced Project partners. Our technical consultants considered this area carefully and think the testing programme outlined for Phases 1A and 1B are well designed. We are satisfied that the Project can start in a timely manner as the Project readiness has been improved through NIA Projects, including a Project to design the test sites. There has also already been substantial stakeholder engagement and there is Government support for the Project.

2.30. Based on the above rationale, we will provide £8.9m in NIC funding to H21.

[9] NGN estimates converting 1/3 of the gas distribution network to 100% hydrogen would have cumulative financial benefits of £48 million by 2050, relative to the scenario where decarbonised heat is delivered through electrification.

[10] Projects that are TRL 1 – 3 (research activities) and TRL 9 (proven activities), as defined in the Gas NIC Governance Document, are not eligible for NIC funding.

[11] The H21 submission said the project would start at TRL 5 and end at TRL 8.

Projects not selected for funding

Tain Innovative Gas Grid – Fulcrum Pipelines Ltd: NIC funding requested £2.1 million, other funding £1.6 million

Overview

2.31. The proposed NIC Project aimed to deliver Compressed Natural Gas (CNG) and biomethane to Tain in northeast Scotland via a new standalone network, not connected to the existing GB gas grid. Fulcrum argues that Tain is too far from the GB gas grid for a conventional, physical connection to be economic, so most households in the town currently use electric heating. Fulcrum also argues that the NIC Project would have helped alleviate fuel poverty in Tain as gas is cheaper than electric heating which the majority of the town uses. The Project would have benefited from a separate scheme (not proposed to be funded through the NIC) to supply a nearby distillery with CNG. This Project would provide the infrastructure to supply CNG to the new network in Tain. The trial would have included the development of new regulatory and technical standards to allow the network to transport gas without the need for ongoing subsidies as is the case with Statutory Independent Undertakings (SIUs).[12]

Summary

2.32. The Expert Panel support the Project's aim to reduce fuel poverty in Tain, with potential future learning that could be applied to other remote towns. However, it does not consider that the Project has a robust methodology, nor is it relevant and timely. Sufficient evidence of customers' willingness to pay to connect to the new network was not provided and there has been no financial or 'in-kind' commitment from key local stakeholders. The Expert Panel therefore consider that the Project is too risky given the unproven benefits case. The Panel is also disappointed that the bid doesn't contain details of how an alternative pricing regime would be developed and it is concerned that having a monopoly gas supplier would have implications for the competitiveness of the pricing arrangements. The Expert Panel recommend that we do not fund this Project.

Assessment and decision

2.33. We, like the Panel, welcome a NIC bid from an Independent Gas Transporter (IGT) and support the aims to reduce fuel poverty in areas remote from the gas grid. However, we agree with the Expert Panel's view that the Tain Innovative Gas Grid

[12] There are five SGN and one WWU SIUs. These are remote networks which have a gas network that is operating in isolation to the physical national network. The regulatory framework of the SIU network costs are socialised via the NTS licence (Special Condition 11F) which specifies the annual payments to both SGN and WWU to cover the costs of the operation of the independent networks.

Project does not perform strongly against the NIC criteria. We have therefore decided not to award NIC funding to this Project.

2.34. The Project has a limited benefits case. The main financial benefits case is calculated using a SIU approach as the counterfactual. We do not agree that this approach is realistic and think that the more appropriate counterfactual to use is the current situation in Tain (ie that there is currently no gas network). Fulcrum also claims that there would be financial benefits to the people of Tain through converting to a cheaper fuel source. While the fuel itself may be cheaper, the bid does not demonstrate consumer willingness or ability to fund the capital expenditure required to convert to gas heating, especially for fuel poor owner-occupiers.

2.35. As there is a limited benefits case in Tain, and a limited ability to roll out the learning, we do not consider that the Project is good value for money for gas consumers. The benefits would also only accrue to the people of Tain and the scope for potential rollout is very narrow, meaning only a small number of GB consumers could benefit from the learning. The Project identifies a number of other off-grid towns for a future roll out, but it is unclear if other Network Licensees would choose to roll out similar solutions or be in a position to benefit from the learning generated by the Project.

2.36. We are concerned that there would be no provision for supply competition in the network. Whilst the submission says a relative price cap would be implemented to protect consumers, the details have not been sufficiently developed so it is unclear how the price would be set in the interests of current and future consumers in Tain.

2.37. The development of new technical standards and new regulatory and commercial frameworks would be innovative. However, we do not consider all aspects of the Project to be innovative, such as the use of hybrid heating systems.

2.38. We consider the choice of Project partners to be good and recognise they all bring relevant knowledge to the Project team. However, the Project partners have not committed any funding towards the innovative aspects of the Project. The external funding from the Highland Council and the two housing societies outlined in the bid has not been committed and would be subject to approval later in the Project. The Project would have been more robust if these commitments had been secured before the submission deadline.

2.39. The Project plan is well thought through. However, it relies on the supply of CNG to the nearby distillery, which has not been fully committed to so could affect the robustness of the Project methodology. We also agree with the Expert Panel that the lack of evidence of consumer engagement and stakeholder commitment could affect the success of the Project.

2.40. Based on the above rationale, we have decided not to fund this Project.

Feedback from this year's Gas NIC

Expert Panel Feedback

2.41. The Expert Panel provided some general views on the quality of the submissions in its recommendation report, including:

- The Expert Panel noted that the question and answer process provides value to the NIC by strengthening the bids and alleviating any concerns. However, the Panel was disappointed that not all the bidders responded fully to the questions asked.
- The Panel found that some of the benefits cases should have used more realistic evidence and Projections.
- It is pleased that several Project partners made financial contributions to the Projects but is disappointed that there wasn't more significant external funding, which would have provided better value for money to gas consumers.

2.42. The Expert Panel is pleased to see the companies use learning from Network Innovation Allowance (NIA)[13] Projects in NIC submissions and it wants to encourage this behaviour. It notes that the bids increasingly refer to learning from previous NIC and NIA Projects, international experience and third parties. It is also pleased to see evidence of collaboration and strong partnerships developing to deliver innovation.

Ofgem Feedback

2.43. We are generally pleased with the proposals brought forward and agree with the views of the Expert Panel above.

2.44. We encourage the network companies to continue to engage with the NIC process. We agree with the Panel that it is most beneficial for the companies to respond fully to questions during the process to alleviate any concerns raised by either the Panel or Ofgem. It is also important for the companies to justify to us why its bid meets all the criteria specified in the Gas NIC Governance Document[14] using the definitions and requirements of the Governance Document.

2.45. We do not agree with how some licensees have developed the benefits cases for Projects. We expect companies to calculate benefits in line with the method in the Gas NIC Governance Document and the Base Case used should therefore be the

[13] The NIA was introduced as part of the RIIO price controls. It provides funding to RIIO network licensees, either to fund small projects that have the potential to deliver financial benefits to the licensee and/or its customers, or to fund the preparation of submissions to the Gas NIC.
[14] Where we refer to the Governance Document in this chapter we are referring to the Gas Governance Document.

most efficient method currently in use on the GB transportation system, which we interpret as what is currently considered 'business as usual'.

2.46. We expect the network companies to consider this feedback when developing submissions for next year.

3. Decision on Electricity Network Innovation Competition

Chapter Summary

We have decided to fund five of the Projects for which we received Full Submissions. We have decided to place additional conditions on three of these Projects. In total, we are providing up to £42 million of funding.

3.1. We received seven submissions to this year's electricity NIC requesting a total of £63.9m of NIC funding:

- SPEN (LV Engine), UKPN (Active Response) and WPD (HARP) requested £35.6 million to develop and trial new pieces of power electronics;
- SPEN (Fusion), SSEN (Transition) and WPD (EFFS) requested £21.2million to support the future development of markets for flexibility;
- ENWL (Powersaver Plus) requested £7million to trial the deployment of energy efficiency measures by DNOs to reduce the need for conventional network reinforcement.

Our Decision

3.2. Based on the evidence provided by the network companies, and the Expert Panel's recommendations, we have decided to:

- **fully fund two Projects**, Active Response and LV Engine as submitted.
- **conditionally fund three Projects**, EFFS, Fusion and Transition with additional conditions to be complied with, including a reduction in combined proposed costs, by the Network Licensees before the NIC funding can be accessed. This is to ensure value for money for customers and coherent learning outcomes. We explain the additional conditions below; and
- **not to fund** two Projects, HARP and Power Saver Plus.

3.3. We summarise the reasons for our decisions below. The Expert Panel's report, published alongside this document, provides its assessment of each Project against the NIC evaluation criteria and should be read alongside this decision document. We broadly agree with the Expert Panel's assessment of all the Projects and its reasons and recommendations on which Projects to fund.

Projects selected for funding

Active Response to Distribution Network Constraints (Active Response) – UK Power Networks (UKPN): NIC funding awarded £13.8 million, other funding £4.3 million

Overview

3.4. Active Response aims to address network constraints that may slow the uptake of low carbon technologies. It will develop and demonstrate advanced automation and power electronic devices at low / high voltage levels, enabling increased network meshing where it is not currently possible. If successful, this will release network capacity quickly at minimum cost, and avoid traditional reinforcement.

Summary

3.5. This is a cost effective and timely submission. The Project has the potential to deliver two network solutions, Soft Open Points and Soft Power Bridges. These solutions have the potential to be widely deployed across the GB Network, increasing the capacity of the existing distribution networks.

Assessment and decision

3.6. The Expert Panel is satisfied the Project offers value for money to customers, and we agree. UKPN and its Project partners will provide £4.3 million, approximately 24% of the total Project cost. The contributions provided exceed the compulsory contribution by approximately £1.3 million. A large proportion of this will be made up of the direct benefits through avoided reinforcement works at a primary substation in Stevenage. The Project is forecast to break even three years after the Project end date. The Expert Panel is also satisfied with the Project's ability to deliver learning relevant to all GB network customers' through the Project's collaboration between UKPN and their Project partner, SPEN.

3.7. We agree with the Expert Panel's report and consider that the Active Response Project performs well across all of the evaluation criteria. We have described how the Project performs against the high-level evaluation criteria below.

3.8. Active Response will accelerate the development of a low carbon energy sector and has the potential to deliver net financial benefits to customers. The two network techniques being trialled (the Soft Open Point and Soft Power Bridges) have the potential to allow the connection of additional Low Carbon Technologies (LCTs) to the network without the need for traditional reinforcement. Overall, UKPN predict the two techniques could offer savings of £720 million to network customers and release approximately 7 GVA of capacity by 2050, if rolled out across the GB network.

3.9. The Expert Panel is satisfied the Project will generate knowledge that can be used by all GB DNOs. This will cover the challenges of real time network optimisation. We agree, and are satisfied with the knowledge dissemination activities outlined within the submission. UKPN state within the submission that the Project conforms to the default IPR arrangements.

3.10. The Active Response Project is innovative. It will develop the power electronics required, utilising a new component (silicon carbide) in the soft open points while soft power bridges are completely novel. The Project will also develop the algorithms and control software required for this technology to be controlled remotely. As the technology is unproven, we are satisfied that the Project would not be funded as part of business as usual.

3.11. The Project is timely, as increasing numbers of LCTs are connecting to the distribution networks. The real-time flow management capabilities developed by the Project have the potential to resolve the issues caused without the need for traditional network reinforcement. We and the Expert Panel consider that if the technology is proven to be successful, the learning developed by this Project could be incorporated in to the RIIO-ED2 business plans. We and the Expert Panel are satisfied that UKPN have selected appropriate partners for the Project. Ricardo Energy & Environment, CGI and Turbo Power Systems (TPS) all have experience in this field. We are pleased to see UKPN building on the relationship they established with TPS in an earlier innovation Project and welcome the involvement of another DNO in the Project. Active Response is also supported by WPD, Transport for London and the Transport Research Laboratory.

3.12. The Expert Panel are pleased to see Active Response building on learning from earlier NIC Projects. This includes the utilisation of a team with experience in delivering a recently completed innovation Project. We were also satisfied the submissions contains a robust risk register and Project plan.

LV Engine – SP Energy Networks (SPEN): NIC funding awarded £7.3 million, other funding £0.9 million

Overview

3.13. LV Engine will trial Solid State Transformers (SSTs) at secondary substations for the first time on the GB Distribution Network. This will enhance network flexibility and release capacity within the existing low voltage infrastructure to facilitate the increasing uptake of Low Carbon Technologies. These transformers would also have the potential to provide direct current connections to networks customers.

Summary

3.14. We agree with the Expert Panel's view that the Project will provide excellent learning regarding the future deployment of SSTs on the GB Distribution networks. In particular, the Panel consider the involvement of two DNOs will ensure this learning is disseminated across the GB network.

Assessment and decision

3.15. The Expert Panel note SPEN's performance within the bilateral meetings, where they consistently demonstrated both the strength of the proposal and their methodological approach.

3.16. We agree with the Expert Panel's report and consider that the LV Engine Project performs well across all of the evaluation criteria and that it should be funded. We have described how the Project performs against the high-level evaluation criteria below.

3.17. We are satisfied the Project has the potential to bring carbon and financial benefits to customers. The technology being trialled will, if successful, allow the connection of more LCTs by enabling load sharing across substations. While this technique will not create any additional capacity when compared against the counterfactual of traditional reinforcement, it will allow more efficient use of existing capacity than is currently possible. SPEN state the technology has the potential to be rolled out at 36,270 sites across GB, saving network customers £528 million compared to the counterfactual base-case. The Project also has the potential to deliver additional carbon and capacity benefits through the provision of DC connections, which are not quantified within the submission.

3.18. We agree with the Expert Panel that the method being trialled has the potential to deliver value for money when compared to traditional network reinforcement. SPEN will run a competitive process to procure a manufacturer for the SST. Overall, SPEN and the Project partners will contribute £54k in addition to the licensee compulsory contribution. The Project is forecast to repay network customers within three years of the Project's completion.

3.19. The Project will generate valuable knowledge about the use of power electronics on the distribution system. In addition, the Expert Panel recognise the value of learning relating to the provision of DC connections. The submission includes a knowledge dissemination plan that outlines a wide range of activities beyond the minimum requirements of the Governance Document.[15] LV Engine will conform to the default IPR arrangements.

3.20. We agree with the Expert Panel that the Project is innovative, as it will be the first time SSTs have been deployed on the GB distribution network. It will also be the first time a DNO has attempted to offer DC connections in conjunction with the existing AC networks. As both of these aspects have not been tested on the GB Network, it is unlikely this Project would be undertaken without innovation funding.

3.21. As noted above SPEN will tender for an equipment manufacturer. There are benefits to having a manufacturer as part of Project teams at an early stage.

[15] Where the Governance Document is referred to in this chapter, it is referring to the electricity Governance Document.

However, we are comfortable about the size of the potential manufacturer base, and that running a tender is likely to enhance the value for money to consumers when implementing the Project. The Expert Panel is pleased at the inclusion of UKPN as a partner to ensure the learning generated would be replicable over a variety of different distribution network situations.

3.22. The Project is timely owing to the developments in power electronics and the need to find alternatives to current technologies. We agree with the Panel and believe that, if proved successful, the technology and learning developed through this Project will be ready for consideration in future business planning.

3.23. Overall, the Expert Panel is satisfied with the methodology presented within the submission. Although it originally had concerns regarding the metering arrangements for the DC connections, it is now convinced that this obstacle can be overcome based on SPEN's responses to these queries within the bilateral meetings. We agree with the Panel.

Projects supporting markets for flexibility

3.24. The remainder of the Projects we have decided to fund, on a conditional basis, all examine aspects of facilitating markets for flexibility.[16] While each Project has a different area of focus, there are areas of commonality. In this section, we discuss how each Project performs against the evaluation criteria in isolation. We also consider how these Projects interact and sit within the portfolio of NIC Projects in general and with each other in particular as well as the current policy environment.

3.25. Developing the energy system of the future is a significant area of work for network companies, Government and Ofgem. We need to understand what market and regulatory arrangements will best deliver value for customers. Along with Government, we published the Smart Systems and Flexibility Plan earlier this year.[17] Industry is also developing its thinking on the evolution to DSO roles, for example through the Energy Networks Association's Open Networks Project.[18] While we have decided to award funding to a number of Projects this should not be seen as an endorsement of a particular model for the future. We expect that learning from these Projects will provide insight to the relative merits of different models and frameworks, and will be valuable in the development any market model. With this in mind, we expect DNOs to recognise different roles for monopolies and third parties. Sharing the learning from the EFFS, Fusion and Transition Projects is with all those with an interest in future markets for flexibility. DNOs should also recognise

[16] Broadly, flexibility can refer to the ability to modify generation and/or consumption patterns in reaction to an external signal. Markets for flexibility could allow energy resources to provide services to meet the needs of the network operators and the system operator, as well as trading with each other to meet their own needs.
[17] https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan
[18] http://www.energynetworks.org/electricity/futures/open-networks-project/

interactions with Ofgem's review of network usage signals,[19] and maximise learning in this context.

3.26. The Panel has recommended funding all three Projects, subject to a number of conditions, and we agree with its recommendation. Before we make funding available, the Project teams for each of the three Projects must undertake a coordinated review that requires the licensees to:

- Define the scope of works to identify and resolve potential areas of duplication between the three Projects;
- Undertake a detailed definition of requirements to decide on the use of complementary market models;
- Consult on proposed activities so that the work is coordinated and aligned to ensure customers are informed on a "holistic" basis;
- Outline detailed trial definitions and agree high-level trial requirements including, *inter alia*, the development of relevant Stage Gates as a means of formally testing the continued validity of the proposed trials;
- Ensure the dissemination activities are coordinated so that stakeholders are informed in a coordinated fashion;
- Agree suitable Stage Gates to align the phasing of the Projects such that all three have concluded the Design Stage prior to moving to deployment;
- Define cooperation activities identifying how Projects will interact, how peer review of outputs will work, who will be attending Project meetings, and how the various work packages will align and complement the Open Networks Project's activities.

3.27. This review process is based on a proposal made by the three Project teams in the course of our evaluation. The outputs of this review must be endorsed by the Open Networks Project Steering Group before we consider whether to approve the revised plans. We will only approve the revised plans and allow access to funds in Project bank accounts where we have been convinced the revised portfolio of Projects are delivering value for money to customers and there is no unnecessary duplication.

3.28. If our conditions of funding for these Projects are accepted, we will include the full amount requested in this year's Funding Direction. Reductions in Project

[19] https://www.ofgem.gov.uk/publications-and-updates/reform-electricity-network-access-and-forward-looking-charges-working-paper

budget resulting from the review described above will be returned to customers through the Funding Direction we will issue in 2018.

3.29. The remainder of this section discusses each Projects performance against the evaluation criteria and our decision in isolation from one another. In the remainder of this section, we make statements about the specific Projects being discussed, eg we may state the Project has a robust methodology or is good value for money to customers. When evaluating Projects in isolation we have the views expressed below. However, when considered together we are concerned about the level of unnecessary duplication that may occur if all three Projects are funded without unnecessary duplication being identified and removed.

Electricity Flexibility and Forecasting System (EFFS) - Western Power Distribution (WPD): NIC funding awarded £2.9 million, other funding £1.3 million

Overview

3.30. The Electricity Flexibility and Forecasting System (EFFS) will build and test new network software to improve network load forecasting and identify long/ short-term opportunities for the buying and selling of flexibility services. This software will support the evolution of DSO roles by building capabilities to support the development of any models for accessing flexibility.

Summary

3.31. The Expert Panel is satisfied this Project will, if it is successful, provide learning regarding the creation of the software for forecasting the need for, and sources of, flexibility on the distribution network. The proposal is timely owing to its links to other innovation Projects, the Cornwall Local Energy Market trial and the ENA Open Networks Project. The learning from this Project should feed into RIIO-ED2 business plans.

Assessment and decision

3.32. We agree with the Expert Panel's report and consider that the EFFS Project meets all of the evaluation criteria and that it should be funded, subject to the condition described above. We have described how the Project performs against the high-level evaluation criteria below.

3.33. We are satisfied that the Project has the potential to deliver carbon and net financial benefits to customers. The IT interface will facilitate the connection of additional LCTs to the network by supporting the provision of flexible network services. WPD predict the methods being trialled could release 630MVA of network capacity for LCTs while saving network customers £240 million through avoided network reinforcement by 2050, if rolled out across GB. We consider the Project has the potential to deliver significant benefits.

3.34. We agree with the Expert Panel that, in isolation, this Project represents value for money to GB network Customers. Through the condition described above, we hope this be enhanced by removing areas of unnecessary duplication. WPD and AMT Sybex will make a contribution of £1.3 million to the Project, approximately 30% of the total Project cost. This contribution exceeds the licensee compulsory contribution by £1 million. We also believe the Project's proposed interactions with the Cornwall Local Energy Market (LEM) will enable the Project to leverage learning, enhancing the potential value for money.

3.35. The Project will generate knowledge relevant to all GB DNOs. In particular, EFFS will create learning around the establishment of a new network interface tool. This interface will include algorithms to calculate improved network capacity forecasts in order to facilitate the procurement of flexibility. The Project will also create conflict avoidance strategies, protocols for third party interactions and learning on how it can link to other network flexibility systems.

3.36. In order for this learning to deliver the most value to network customers we believe it is important the Project continues to liaise with the Open Networks Project. This is to ensure it reflects the interests of all parties involved, avoids unnecessary duplication and ensures the development of the interface will provide valuable learning for the range of market model frameworks proposed by the Open Networks Project. EFFS will conform to the default IPR arrangements.

3.37. The EFFS Project is innovative. The software interface, forecasting algorithms and protocols proposed have not been trialled on the GB network. We are satisfied that the Project could not be undertaken as part of business as usual as the novel nature of the solution means there are significant commercial risks in its establishment.

3.38. The Project will see WPD working with AMT-Sybex, a provider of network software, EDF energy and the GB SO. All of these partners have relevant experience and the Expert Panel is particularly pleased to see a commitment from the GB SO SO to participate as they believe the work on conflict avoidance between a DSO and the GB SO would be vital to the potential GB roll out of the platform. We agree and expect to see this Project continue to coordinate with the ENA Open Networks Project and to work closely with the Transition and Fusion Projects.

3.39. The submission is relevant and timely as the learning generated by the Project can feed into the RIIO-ED2 business plans. The energy system is changing and this Project will provide valuable learning.

3.40. The Project demonstrates a robust methodology for delivery. The Expert Panel identified and we agree there is particular value in the Project's proposed interactions with the Cornwall LEM Trial and involvement of Capita's Chief Data Scientist acting as the Design Authority for the algorithm work. The submission includes a detailed risk register and Project plan.

Fusion – Scottish Power Distribution (SPEN): NIC funding awarded £5.3 million, other funding £0.6 million

Overview

3.41. The Fusion Project will trial local flexibility market using an existing, structured and competitive market-based framework developed in Europe. The Universal Smart Energy Framework (USEF) has the potential, if successful, to support the DNO and all market actors to unlock the value of local network flexibility. The Project will demonstrate how DNOs could harness flexibility to manage a network constraint located in East Fife.

Summary

3.42. This Project will provide relevant and timely learning regarding the application of an existing market framework in which participants' roles are already clearly mapped to the GB Network. This learning can be incorporated into business plans for RIIO-ED2.

3.43. The Expert Panel also considers that the method being trialled has the potential to deliver significant financial and carbon savings if rolled out across GB.

Assessment and decision

3.44. We agree with the Expert Panel's report and consider that the Fusion Project meets all of the evaluation criteria, and that it should be funded subject to the condition described above. We have described how the Project performs against the high-level evaluation criteria below.

3.45. Fusion performed well against the financial and environmental benefits evaluation criteria. SPEN estimates the GB roll-out of the USEF could provide net financial savings of £236 million to network customers by 2050. This is compared to a counterfactual involving a combination of bilateral trading agreements between DNOs and ancillary services/ traditional network reinforcement. SPEN also estimate the method being proposed has the potential to release additional capacity of 5.5GW from the existing network assets in the Project area. We had concerns regarding the initial base cost proposed for the Project. However, we are pleased SPEN amended the base costs within its resubmission.

3.46. We think the Project represents value for money when viewed in isolation. We intend to enhance this through the condition referred to above. In addition to the amended base costs described above, as part of its resubmission, SPEN found efficiencies of approximately £1.5 million based on assumptions regarding cooperation with the Transition and EFFS Projects. SPEN and its Project partners do not propose to make any additional contributions to the Project on top of the compulsory licensee contribution.

3.47. The Project will generate knowledge relevant for all GB DNOs. The Project will create learning regarding the application of the USEF to the GB distribution network, and how it can be applied to the procurement of flexibility to mitigate the need for network reinforcement to address network constraints. The Project will also create an IT Platform required for the trading of these services for the purposes of the Project. In order for this learning to deliver the most value to network customers, we believe it is important the Project continues to liaise with the Open Networks Project to ensure it reflects the interests of all parties involved. Fusion will conform to the default IPR arrangements.

3.48. This Project is innovative. This will be the first time the rules specified within the USEF have been implemented on the GB network. The utilisation of the neutral market platform to purchase flexibility services in the place of bespoke bilateral agreements is also unproven. We agree the commercial and technological risks of the method to be trialled mean this could not be undertaken as part of SPEN's business as usual activities.

3.49. We agree with the Expert Panel that the Project involves a broad range of Project partners. DNV-GL Ltd are the founding partner of the USEF foundation and will provide Expertise in transferring the framework to the GB network. Passiv Systems and Origami Energy will provide Expertise in engaging aggregators and industrial and commercial customers. The University of St Andrews has also committed to provide flexibility services at no cost throughout the Project and for two years after Project completion.

3.50. We are satisfied the submission is relevant and timely. The Expert Panel's view is that the learning generated by the Project is required now if it is to feed into the RIIO-ED2 business plans, and we agree. We also consider there is value in the Project feeding into the Open Networks Project.

3.51. The Project has a robust methodology and is ready to implement. We and the Expert Panel both initially had concerns regarding whether the distribution network in East Fife is representative of the GB network as a whole. However, we accepted SPEN's arguments regarding its representativeness and the efficiencies and benefits of utilising a network that already contains the required monitoring, and metering equipment. These factors mean that the Project will serve as a good test bed that is sufficiently representative of GB.

3.52. The Expert Panel also saw the benefit in trialling an existing framework where market participants' roles are predefined. We agree with the Expert Panel that this means the framework can be put in place in a timely fashion.

Transition – Scottish and Southern Energy Networks (SSEN): NIC funding awarded £13.1 million, other funding £1.5 million

Overview

3.53. Transition will design and demonstrate the tools needed to deliver the models for accessing flexibility considered by the Open Networks Project's TSO-DSO work stream.

Summary

3.54. The Expert Panel considers that Transition is timely owing to its close interactions with the ENA Open Networks Project and because of the potential for learning to feed into the RIIO-ED2 business plans.

Assessment and decision

3.55. The Expert Panel is pleased with the involvement of other DNOs in the Project. This means the learning is likely to be relevant for the GB network as a whole and the potential financial benefits predicted are significant. Overall, the Project performed well across all of the evaluation criteria.

3.56. We agree with the Expert Panel's report and consider that meets all of the evaluation criteria and that it should be funded, subject to the condition described above. We have described how the Project performs against the high-level evaluation criteria below.

3.57. If proven successful, the types of market framework to be trialled are forecast to:

- save network customers £292 million;
- reduce carbon emissions by 785 ktC02e; and
- release 0.5 GW of network capacity if rolled out across GB by 2050.

3.58. The majority of these savings will be generated through the creation of a market for flexibility services. We note Transition took on board the Expert Panel's advice from previous years to base the counterfactual on the actual alternative solutions they would deploy in response to the identified network constraints.

3.59. The Project, when viewed in isolation, offers value for money to network customers. We intend to enhance this through the condition referred to above. SSEN and its partners are providing the licensee compulsory contribution. However, we agree with the Expert Panel that this Project will deliver valuable learning on the viability of potential future market frameworks. SSEN predict the Project will repay the NIC funding by 2029.

3.60. The Project has the potential to generate knowledge which will be relevant to all DNOs in GB, as well as other participants in markets for flexibility. The Project will identify the data sharing requirements necessary to facilitate a market for flexibility services. It will establish the IT systems to facilitate the market, for the purposes of the trial. We do not know what procurement model will be appropriate on an enduring basis, but we expect the Project to ensure the knowledge generated will be useful no matter what model or models are adopted on an enduring basis. Transition will conform with the default IPR arrangements.

3.61. We and the Expert Panel agree this Project is both technically and commercially innovative. This will be the first time the models for accessing flexibility proposed by the ENA Open Networks Project are tested on the GB distribution network. It will also be the first time a DNO has attempted to use such a market framework to resolve network constraints/release additional capacity on their network in the place of bespoke bilateral agreements between the Network Licensee and ancillary flexibility services. The Project will also create the IT system architecture required to deliver these market frameworks. Overall, we are satisfied that the risks involved in utilising untested frameworks and equipment mean this Project would not be undertaken without the support of innovation funding.

3.62. The Project will be a collaboration between SSEN, ENWL, Northern Powergrid, Atkins CGI and Origami Energy Ltd. We and the Expert Panel are content the knowledge and Expertise brought by these Project partners means the Project will be implemented effectively. The presence of other DNOs means the learning should be applicable across GB. However, we would like to have seen the involvement of the GB SO formularised within the submission. We also expect to see this Project continue to coordinate with the ENA Open Networks Project and to work closely with the EFFS and Fusion Projects.

3.63. We are satisfied the submission is relevant and timely. The Expert Panel accepts the statements made by SSEN, that the Project needs to start in 2018 if learning is to be incorporated in to business plans for RIIO-ED2.

3.64. Both we and the Expert Panel are convinced the Project displays a robust methodology and is ready to implement. The Expert Panel note the value in the Project's direct links with the ENA Open Networks Project. The Full Submission contains a detailed risk log and Project plan.

Projects not selected for funding

3.65. We have decided not to fund two Projects. While they were aiming to address critical problems, they did not perform sufficiently strongly against the evaluation criteria set out in the NIC Governance Document. We did not consider that we would be able to resolve the concerns we have by placing further conditions on funding. These Projects and our reasons for not funding them are described below.

Power Saver Plus (PS+) – Electricity North West Limited (ENWL): NIC funding requested £7.0 million, other funding £1.1 million

Overview

3.66. Power Saver Plus proposed to investigate the DNOs leading the delivery of customer-focused energy efficiency measures. It would have delivered an evaluation tool for DNOs and other stakeholders to identify the most effective mix of energy efficiency measures, to mitigate the need for network reinforcement.

Summary

3.67. Neither we nor the Expert Panel consider that the hypothesis to be tested is sufficiently robust. It is not clear that the combined energy efficiency measures will reduce peak demand, which is what drives reinforcement, rather than overall energy consumption.

Assessment and decision

3.68. We agree with the Expert Panel's view that the Project does not perform strongly across all of the NIC evaluation criteria. We have therefore decided not to award NIC funding to this Project. We have described how the Project performs against the high-level evaluation criteria below.

3.69. ENWL forecast the solution would deliver savings of £350m to network customers and reduce carbon emissions by 179 ktCO2 if it is successfully rolled out across GB. We and the Expert Panel have a number of concerns regarding whether the Project can deliver these benefits.

i. The majority of the interventions proposed, such as energy efficient fridges, washing machines, heating and light bulbs are easily moveable and have a limited 'asset life' relative to network assets.
ii. A large number of the identified network constraints caused by LCTs, such as electric vehicles and heat pumps, are likely to be found in affluent areas. As a result, it seems likely network customers purchasing these LCTs may already own new, energy efficiency appliances thus reducing the potential impact of the method being trialled.

3.70. The Expert Panel does not consider that the proposed methodology will be a viable solution to these constraints, as it cannot guarantee the permanent reductions in peak demand will be achieved. We agree and believe this would mean the Project is unlikely to realise the benefits claimed.

3.71. Given our concerns regarding the methodology we are not confident that investment in this Project would deliver value for money to customers.

3.72. The Expert Panel is not convinced the Project would deliver new knowledge and learning. There is already a significant knowledge-base around engaging with customers on energy efficiency, and the Panel has not been convinced that this Project will deliver sufficient new learning in this area. We agree with the Panel on this point.

3.73. ENWL recruited BRE Consulting, Energy Saving Trust, Delta Energy and Environment, Impact Research and NERA Economic Consulting. While the Expert Panel recognise these partners have relevant experience, there are significant legislative barriers to the rollout of the specific model proposed by ENWL. In order to roll out the proposed methodology, primary legislation would need to be changed to remove the obligations currently placed on suppliers and apply them to distributors. Thus we share the Panel's concerns regarding the non-inclusion of the government department responsible for doing this.

3.74. We and the Expert Panel believe Power Saver Plus to be a relevant and timely submission as there are uncertainties on how GB level energy efficiency will be delivered in the future.

3.75. We also shared the Expert Panel's concerns regarding the methodology proposed by the Project. The Expert Panel is disappointed that there was little evidence of the Project considering the best practice in consumer engagement. We had concerns regarding the lack of detail provided on how the Project would manage the aforementioned risks of the installed energy efficiency measures being easily movable and thus not guaranteeing a permeant reduction in the capacity in the targeted area.

Holistic Active and Reactive Power (HARP) – Western Power Distribution (WPD): Funding Requested £14.5 million, other funding £ 1.8 million

Overview

3.76. The Holistic Active and Reactive Power (HARP) Project would have trialled a Unified Power Flow Controller (UPFC) to control power flows across the 132kV and 66kV networks. This new network equipment aimed to release capacity to accommodate future growth in embedded generation and electricity demand from new low carbon technologies.

Summary

3.77. The Expert Panel recognises the potential of power electronic devices to deliver benefits in the future. However, further evidence would be required demonstrating that there is a need for the UPFC, and that a sufficient number would be deployed for customers to receive a benefit equivalent to their investment in the proposed Project.

3.78. The Expert Panel is also unconvinced the predicted benefits would be realised as it believes there would be a limited appetite amongst other Network Licensees to deploy the new technology in the future.

Assessment and decision

3.79. We agree with the Expert Panel's view that the Project does not perform strongly across all of the NIC evaluation criteria. We have therefore decided not to award NIC funding to this Project. We have described how the Project performs against the high-level evaluation criteria below.

3.80. WPD estimate that the method being trialled would deliver £40 million of savings to network customers if rolled out across GB by 2050, potentially leading to carbon savings of 575kt. However, it would produce less network capacity than the counterfactual base case of traditional network reinforcement. To realise these benefits, the solution would need to be rolled out to 23 sites across GB. We and the Expert Panel do not consider there would be sufficient appetite amongst other DNOs to use UPFCs on their networks and thus have concerns regarding whether these benefits would be realised. These concerns included:

- The relatively small number of sites identified as suitable for UPFCs mean it is unlikely other DNOs would consider this a cost efficient solution. The combination of the need to purchase bespoke spare parts and provide separate staff training in order to maintain only one or two sites on their network is likely to act as a barrier to their uptake.
- It also seems likely that other DNOs will install alternative, cheaper technology on their networks to resolve these constraints. When challenged within bilaterals and the Q&A process on this point WPD stated the key difference between a UPFC and the current alternatives was the speed the unit could respond to this constraint but were unable to satisfactorily explain why a 'fast response' would be required.
- The size and appearance of the UPFC means it is likely there would be local opposition to the construction of the UPFC at some of the sites identified. This opposition has the potential to further reduce the number of deployments across GB.
- The benefits claimed are dependent on the Project finding a manufacturer for the device willing to provide the UPFCs for the price specified within the Full Submission. As WPD has not identified a manufacturer as a Project Partner, it is not possible to validate the benefits listed.

3.81. Overall, and owing to these concerns, we do not think HARP would be able to contribute to the development of a low carbon energy sector or deliver net financial benefits to customers.

3.82. We and the Expert Panel do not consider the Project to represent good value for money. Owing to the reservations outlined above regarding the appetite from other licensees to use UPFCs, we share the Expert Panel's concerns that UPFCs would not be deployed the eight times required to breakeven. These concerns were raised with the WPD during the bilateral meetings. In response, WPD reduced the funding requested by approximately £0.5 million. However, we and the Expert Panel still feel customers would not receive good value for money from the £14 million requested.

3.83. We agree with the Expert Panel that the Project could have created some useful information in relation to the challenges of installing UPFCs on the WPD network. However, the Expert Panel is concerned this may not be replicable on a GB scale owing to the lack of direct involvement from other DNOs or the GB SO. We agree with the Expert Panel.

3.84. We recognise the innovative nature of the Project as this would be the first time a UPFC has been installed on the GB distribution network. To achieve this the HARP would also have created the control software and the network codes/standards required to roll the UPFC out across GB. We agree with the Expert Panel that the Project is sufficiently risky to warrant applying for innovation funding.

3.85. WPD recruited Mott MacDonald as the Project management partner for the Project and designer of the UPFC. The Expert Panel recognise Mott MacDonald's experience in this area but is disappointed that a manufacturer was not recruited one before the Full Submission stage. The potential number of manufacturers likely to build such a device is relatively small. The Expert Panel consider that the presence of such a Project partner, especially if it had made a financial contribution to the Project which reflected their potential future profits would have strengthened the case for funding.

3.86. WPD make the case that the increasing levels of embedded generation connecting to the GB Distribution Network means there is a need for a solution that could resolve short term network constraints. While the Expert Panel acknowledge such a solution is required to control power flows on the network, it is not clear such constraints could not be resolved using more cost efficient network equipment. We agree with the Panel.

3.87. While the submission includes a Project plan and detailed risk register, we share the Expert Panel's concerns regarding some key elements of the proposal including the potential barriers to the GB roll out outlined above. We note WPD's decision to include a stage gate in the proposal, which would have halted the Project if they could not identify a manufacturer for the UPFC, and the decision not to purchase land for the trial until after such a partner had been recruited.

Feedback from this year's Electricity NIC

Expert Panel Feedback

3.88. The Expert Panel provided both general and Project-specific views on the quality of the submission in its 2017 recommendation report. Its general views include:

- The Expert Panel would like to see Network Licensees continue to collaborate on NIC Projects. This would give them comfort about the potential for the solution to be rolled out across the GB Network.
- The Full Submission documents should be written in a clear and concise manner to enable the Expert Panel to easily identify the problem the Project is attempting to resolve and how the proposed solution will do this.
- As per previous years, the Expert Panel expects the counterfactual (s) base case for each submission to be based on the actual alternative technologies/ network management techniques available to the Network Licensee to resolve the identified constraint. Where this is not the case, for example if the counterfactual is based on traditional network reinforcement, the Expert Panel found key information on the costs and benefits was obscured.
- Finally, the Expert Panel is pleased to see the continued participation of senior management from the Network Licensees in the NIC process and would like to see this continued/developed further.

Ofgem Feedback

3.89. We were generally pleased with the Project ideas brought forward and agree with the views of the Expert Panel above. We urge the companies to ensure that their submissions are clearly written and subject to detailed review before submission.

3.90. For future competitions, we would like to see Network Licensees clearly identify within the Full Submission document how they have incorporated and acted on our feedback from the Initial Screening Process.

3.91. We expect the network licensees to consider this feedback when developing submissions for next year.

4.Next steps

Chapter Summary

4.1. Projects will each receive a Project Direction in December 2018 and will receive funding from 1 April 2018. We will publish the dates for next year's competition in early 2018.

Funding of selected Projects

4.2. Before funding a Project, we issue a Project Direction explaining the terms that the funded network company has to comply with as a condition of receiving NIC funding. If the network company agrees to comply with its Project Direction, we will issue a Funding Direction to specify the amount of money to be recovered from network customers next year, through their network charges, to fund the successful NIC Projects. We will issue the Funding Direction by the end of December 2017.[20] We expect the funded Projects to start as soon as possible, each according to the terms in its Project Direction and the applicable NIC Governance Document.

Monitoring of Projects and dissemination of learning

4.3. We will monitor each Project to ensure it is implemented in line with its Project Direction. Each Project will have to provide regular progress reports, in line with the requirements of the NIC Governance Document. These will be published on the companies' websites to make Project learning available to all interested parties. Learning from the Projects should also be made readily available and shared according to the Projects' plans.

4.4. The Energy Networks Association has a portal which holds information and learning from innovation Projects, including from the Low Carbon Networks Fund (LCNF) and the Gas and Electricity NICs, and we expect learning from this year's Projects to also be made available through the portal.[21]

4.5. Finally, network companies have an obligation to hold an annual conference, open to all, where they present what they have learned from their Projects (including previously funded NIC Projects). The conference is called the Low Carbon Networks & Innovation Conference. Further information can be found on its website.[22]

[20] Detail on the funding direction can be found in the NIC Governance Documents.
[21] http://www.smarternetworks.org/
[22] http://www.lcniconference.org/