

Gas Network Innovation Competition: 2016 funding decision

Decision

Publication date: 30 November 2016

Contact: Tom Mackenzie

Team: Networks

Tel: 020 7901 7406

Email: networks.innovation@ofgem.gov.uk

Overview

We run an annual Gas Network Innovation Competition (NIC) to stimulate innovation in the gas networks. Through the NIC, network companies can apply for up to £18 million to fund innovative projects which have the potential to deliver benefits to gas customers. This document explains which projects we have selected for funding this year.

This was the fourth year of the Gas NIC and there were three applications for funding, though one project withdrew. Of the remaining two projects we have selected both for funding under the NIC. This decision is consistent with the recommendations of our independent Expert Panel. We propose to award £11.6 million to these projects. If the projects go ahead, the network companies will also provide £1.3 million in funding to the projects.

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

Context

Gas 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 challenging business as usual and enabling a more rapid pace of change in the sector.

Gas network companies will need to innovate in the way they design, plan, and operate their networks, delivering the services that customers want. The Gas NIC is designed to help stimulate this innovation. It provides up to £18 million of funding each year to encourage gas network licensees to run trials of new technology and different commercial and network operating arrangements.

Gas network operators will gain understanding 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 gas customers in the future.

This year's Gas NIC has been run in parallel with our Innovation Review. As part of which we will shortly be publishing a consultation on governance changes to the Gas and Electricity NICs. None of the proposed measures being consulted on affect our NIC funding decision this year, but some will affect next year's competition should they be implemented.

Associated documents

Gas NIC Governance Document

https://www.ofgem.gov.uk/sites/default/files/docs/2015/07/gas_nic_2-1_stat_con.pdf

RIIO-T1 Strategy Decision

<https://www.ofgem.gov.uk/publications-and-updates/decision-strategy-next-transmission-price-control-riio-t1>

RIIO-GD1 Strategy Decision

<https://www.ofgem.gov.uk/publications-and-updates/decision-strategy-next-gas-distribution-price-control-riio-gd1>

Contents

Contents	3
Executive summary	4
1. Introduction	5
Purpose	5
How the NIC works	5
The 2016 competition	6
2. Decision	7
Feedback on this year's competition	10
3. Next Steps	12
Future competitions and our Innovation Review	12
Funding of selected projects	12
Monitoring of projects and dissemination of learning	12
Appendix 1 – NIC evaluation criteria	14

Executive summary

The Gas NIC encourages network companies to innovate in the design, development and operation of their networks and to engage with third parties in doing so. It provides up to £18 million of funding for a small number of large-scale innovation projects. Trials financed through the NIC will create knowledge for all licensees that will also be made available to all interested parties. This brings potential environmental benefits and cost savings for current and future gas customers.

This document contains our decisions on the projects to which we have decided to award NIC funding. This is the fourth year of the Gas NIC and we received two submissions requesting a total of £11.6 million of the £18 million available funding. We have selected both projects for funding.

2016 Gas NIC Projects	NIC funding awarded
HyDeploy - will demonstrate on Keele University's private network that natural gas containing levels of hydrogen (10% to 20%) beyond those permitted by the current safety standards (0.1%) can be distributed and utilised safely. The project will provide evidence to contribute towards the case for allowing increased use of hydrogen on the network. <i>Submitted by National Grid Gas Distribution (NGGD)</i>	£6.8m
Future Billing Methodology - Great Britain has relied predominantly on North Sea gas since the 1970s with regulations and the billing regime designed for this stable and reliable source of gas. The supply market is changing with more gases of differing qualities, such as biomethane, being injected into the network. The current billing methodology isn't optimised to cater for significantly different quality gases. This project will develop options that may lead to new gas billing methodologies to better reflect the world of more varied gas qualities. <i>Submitted by NGGD</i>	£4.8m

We assessed the project proposals against the evaluation criteria outlined in the NIC Governance Document.¹ In reaching the decision to fund both projects we were advised by an independent Expert Panel, which reviewed the project submissions, posed questions to the network companies and reviewed the responses. The Expert Panel recommended that both projects should be provided with funding; we agree with the Expert Panel's recommendations. We plan to place an additional condition on Future Billing Methodology to ensure it delivers good value to gas customers.

In December 2016 we will issue NGGD a document explaining the terms it will have to comply with as a condition of receiving the NIC funding for each project. NGGD will have to act subject to the terms of this document before the projects can progress.

We will shortly be publishing our Innovation Review consultation. As part of the separate consultation we are seeking views on proposed changes to the NIC governance arrangements as well the Electricity NIC funding level. The overall aim of the proposed changes is to ensure that the NIC continues to deliver value for money for customers and drives culture change within the network companies that we regulate. Subject to the outcome that consultation, some of the measures are expected to take effect in the 2017 competition and others would be implemented in time for the 2018 competition.

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

1. Introduction

Chapter summary

We describe the background, structure and process of the Gas NIC, including how we and the Expert Panel have evaluated the projects.

Purpose

1.1. This document explains our decisions on the applications we received for the fourth Gas NIC.² We assessed the projects against the evaluation criteria in the Gas NIC Governance Document³, as well as against our principal objective set out in the Gas Act 1986 and against 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 Panel's recommendation report 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 NIC works

1.3. The Gas NIC encourages network companies to innovate in the way they design, develop and operate their networks. It is an annual competition which provides up to £18 million of funding to a small number of large-scale innovation projects.

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

1.5. The annual competition starts when network companies submit project proposals in the Initial Screening Process (ISP). It 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.

1.6. During the ISP, we consider whether these proposals are eligible for funding based on the requirements set out in the NIC Governance Document (including low carbon or environmental benefits and value for money for customers). Only eligible projects may progress to the 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 Panel consists of people with specific expertise in the energy networks, environmental policy, technical and engineering issues, economics and finance, and consumer issues. The Expert Panel assesses each project against the evaluation criteria set out in the NIC Governance Document – a

² This document constitutes both notice of and reasons for our decision as required under section 38A of the Gas Act 1986.

³ https://www.ofgem.gov.uk/sites/default/files/docs/2015/07/gas_nic_2-1_stat_con.pdf

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>

summary is also given in Appendix 1. It then produces a report (published alongside this decision) on which projects it thinks should be given funding. We consider this report, but the decision on which projects to fund is ultimately ours and our decision could differ from the Expert Panel's recommendations.

The 2016 competition

1.8. This year's competition began with the ISP in April 2016. We received three submissions. We accepted them all; however NGG NTS subsequently withdrew its Haven Energy Bridge Project before the full submission stage.⁵ The remaining two projects made full submissions by the August 2016 deadline. The combined NIC funding requested was £11.6 million of the available £18 million.

1.9. The Expert Panel reviewed the network companies' submissions. It also met the participating network companies and their project partners twice. Where aspects of the submissions required clarification, the network companies could resubmit their proposals. The Expert Panel made its recommendations based on the final submissions and submitted its recommendation report to us in late October 2016.

1.10. We also appointed Frazer-Nash as the technical consultants for this year's competition 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.

1.11. We assessed the projects, taking into account the Expert Panel's recommendations and the evaluation criteria, to decide which projects should receive funding. Our decision on which projects to fund is contained in Chapter 2.

1.12. The Expert Panel's recommendation report, the full submissions, and the questions and answers are published alongside this document.⁶

⁵ The Haven Energy Bridge project aimed to demonstrate the first GB injection of hydrogen into the high pressure transmission grid. The ISP is available here: <https://www.ofgem.gov.uk/publications-and-updates/gas-nic-year-four-screening-submission-haven-energy-bridge-national-grid-gas-transmission>

⁶ All the documents are on our NIC website: <https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/gas-network-innovation-competition>

2. Decision

Chapter summary

We have decided to fund both of the full submissions we received. We have decided to place an additional condition on one of the projects. In total we are approving just under £12 million of funding.

2.1. We have considered all of the evidence provided by the network companies and the Expert Panel's recommendations against the evaluation criteria and against our principal objective set out in the Gas Act 1986 and against our statutory duties. We have decided to:

- Fund HyDeploy as submitted.
- Award the funding requested to the Future Billing Methodology project, but require an additional condition to be complied with by the network company before the project can proceed. This is to ensure value for money for customers and that the funding is being spent efficiently. We explain the additional condition below.

2.2. The Expert Panel's 'Gas NIC 2016 Report and Recommendations', 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.

2.3. Below we summarise the reasons for our decisions.

HyDeploy – National Grid Gas Distribution: NIC Funding £6.8 million, other funding £0.8 million

Overview

2.4. HyDeploy will demonstrate, on Keele University's private gas network, that natural gas containing levels of hydrogen (10-20%) beyond those permitted by current safety standards (0.1%) can be distributed and utilised safely and efficiently. The project will provide evidence to contribute towards the case for allowing increased use of hydrogen on the network.

Summary of assessment and decision

2.5. The Expert Panel thought that the project is timely, well thought through and offers a significant step towards decarbonising heat in Great Britain at a potentially lower cost to the consumer than alternative routes such as electrification of heat. The choice of project partners is also strong, particularly the project's close collaboration with the Health and Safety Laboratory (given its links with the Health and Safety Executive) and academics at Keele University. It also has strong endorsement from stakeholders, including the Committee on Climate Change. The Expert Panel recommended that we fund the project.

2.6. We agree with the Expert Panel's report and consider that the HyDeploy project performed well across all of the evaluation criteria and that it should be funded. In

particular, we agree with Expert Panel's views on the project's strong performance under the relevant and timely, robust methodology and involvement of project partners evaluation criteria.

2.7. The project is relevant and timely as it will contribute to the important area of establishing what role hydrogen can play in decarbonising heat. In addition, it generates knowledge which will be important for us, and networks companies, looking ahead to the next price control (RIIO 2) and wider work looking at the future of the gas network.

2.8. The project is innovative. It would be the first practical deployment of hydrogen onto a live gas network since the 1970s following the move to North Sea gas. We anticipate that HyDeploy would not be undertaken as part of business as usual by the network companies. It is unlikely that the issues would be considered if the network companies continued to operate their networks using natural gas and there are limited direct financial benefits for them from undertaking the project.

2.9. Under the environmental and financial benefits evaluation criterion, the case for this project is good. Carbon emissions can be reduced by lowering the carbon content of gas through blending with hydrogen. If successful, permitting hydrogen on the network at the levels proposed has the potential to facilitate between 15 and 29TWh per year of decarbonised heat in Great Britain.⁷ Furthermore, compared with alternative solutions to decarbonise heat, such as through electrification via heat pumps, the ability to put blended hydrogen onto the gas network offers the potential for substantial customer benefits.⁸ These benefits arise from the ability of hydrogen to be delivered to end consumers using the existing gas network and existing household appliances.

2.10. Based on the project's net benefits, it is seen to offer good value for money to gas customers. Using Keele University's large private gas network is at an appropriate scale and has strong support from stakeholders. NGGD has also improved the value for money of this project by committing that the equipment used to produce hydrogen will either be reused for a future successful NIC project or the supplier will buy it back and return the proceeds to customers.

2.11. While success in this project won't lead to an instant rollout of higher hydrogen content gas onto the network, network companies consider it an important part of a roadmap of projects needed to establish what role hydrogen can play in the future of the gas networks in a low carbon economy.

2.12. The project has a robust methodology and clear plan of other trials (beyond this project) that are required to facilitate rollout, with the next step envisaged to be a trial on a public network. Realising the benefits outlined above is also dependent on the supply side of hydrogen developing on an industrial scale, including low carbon production of hydrogen. Since the project requires direct interaction with consumers, we expect NGGD to conduct a robust consumer engagement programme to ensure that the interests of consumers are fully protected.

⁷ NGGD estimates that levels of hydrogen between 10 and 20% in the GB distribution system would save between 60 and 119 million tonnes CO₂e by 2050 on a cumulative basis.

⁸ NGGD estimates cumulative financial benefits to customers of between £3 billion and £8 billion by 2050, relative to the scenario where decarbonised heat is delivered through electrification (air-source heat pumps).

Future Billing Methodology – National Grid Gas Distribution: NIC Funding £4.8 million (subject to an additional condition), other funding £0.5 million

Overview

2.13. Great Britain has relied predominantly on North Sea gas since the 1970s with regulations and the billing regime designed for this stable and reliable source of gas. The supply market is changing with gases of differing qualities, such as liquefied natural gas and biomethane, being injected into the network. The current billing methodology isn't optimised to cater for significantly different quality gases and this project will develop options for new gas billing methodologies.

Summary of assessment and decision

2.14. The Expert Panel supported the aims of the project and, in particular, considered that it performed well under the relevant and timely, and innovation evaluation criteria. They welcomed that it addressed commercial challenges facing the gas industry as it evolves to accommodate different sources of gas. The Expert Panel also highlighted that there is a need for innovation in the billing methodology to minimise the cross subsidy between consumers receiving different qualities of gas that exists under the current regime. We agree with the Expert Panel that the project is innovative. It largely focuses on regulatory and commercial innovation to develop options for new gas billing methodologies.⁹

2.15. A key benefit of the project to customers is to help to open the gas network to greater low carbon gas sources by reducing the need for expensive and carbon intensive processing (adding propane) that is currently needed. We consider this as important and timely to help decarbonise the heat sector and to meet the UK's commitments to reduce carbon emissions through the Climate Change Act. Under the financial and environmental benefits evaluation criterion, the potential size of the benefits are reasonable, but will be refined during the project, with a key deliverable being a detailed cost benefit analysis of the options for potential future implementation.¹⁰

2.16. The Expert Panel had some reservations under the value for money and robust methodology criteria. Its concern stemmed from uncertainty over the extent of the proposed field work¹¹ required for the project to justify changes to the billing methodology. Until the initial stakeholder engagement phase¹² (over the first year of the project) has been completed, it will not be clear if the field trials are required and/or are adequate to justify a change in the billing methodology. The Expert Panel noted that the project would have been strengthened by more upfront stakeholder engagement to help justify the project through industry support.

⁹ The sensors used to measure the spread of biomethane through the gas network are also innovative and represent an effective way of doing this without needing to make changes to the existing rules and regulations governing the billing of gas.

¹⁰ NGGD estimates, using conservative assumptions on the level of low carbon gases connecting to the network, that reducing the need for propanation could deliver cumulative financial benefits of around £170 million by 2050 to customers, principally low carbon gas producers. Some of this would be expected to flow to end consumers.

¹¹ The proposed field trials will measure the zone of influence of biomethane at two sites using oxygen sensors. The gas quality can be inferred from these measurements. The measurements will be used to validate the use of existing network models to create charging areas and allocate the quality of gas received within an area.

¹² Work Pack 1 in the full submission.

2.17. The Expert Panel recommended funding the project, but introducing a stage gate after the initial stakeholder engagement phase to ensure that the proposed evidence gathering in the later stages of the project is required before committing customers' money to complete the project.

2.18. Our decision is to fund this project and we agree with the Expert Panel's report. We consider the project to be forward looking and support the consideration of change in this area of charging, which has only received limited attention thus far by stakeholders. NIC funding is necessary to help facilitate this project. There are limited direct benefits to network companies to drive such a change unilaterally and it will require stakeholders across the gas industry to work together. The project's plan to engage, share knowledge, and work collectively across industry is good. We also consider DNV GL to be a good choice of project partner due to its technical knowledge of network modelling software.

2.19. However, we agree with the Expert Panel and its recommendation to introduce a stage gate. At the stage gate, NGGD will need to demonstrate more clearly that there is demand for change and justify its approach for developing its new billing options by using evidence from industry engagement. Until this stage gate is passed, the bulk of the NIC funding (over £4m of the awarded £4.8m) should not be spent by NGGD. We consider that the introduction of this stage gate will help ensure the project delivers good value for money to gas customers.

2.20. The introduction of this stage gate could delay the project relative to the timings in NGGD's full submission and we will work with NGGD to amend its submission and reflect any changes in requirements in the project direction.¹³

Feedback on this year's competition

Expert Panel Feedback

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

- It was disappointed by the small number of bids to the Gas NIC and it would be keen for the network companies to suggest ways to improve the NIC to attract more submissions.
- It was disappointed that neither of this year's projects is receiving any direct external funding, despite having strong project partnerships.
- It would also have liked more evidence within the full submissions that project partner costs have been robustly market-tested to guarantee customers are getting value for money.
- Both bids could have been improved by having more detailed information on their customer engagement plans in the full submissions.

2.22. The Expert Panel was pleased to see the companies' continued use of the Network Innovation Allowance (NIA)¹⁴ to fund preliminary work prior to submitting bids to the NIC. It noted that this year's projects provided better evidence of learning from: previous NIC projects, international experience and third parties. The Expert Panel was

¹³ The project direction is a document explaining the terms that the network company has to agree to as a condition of receiving NIC funding. See Chapter 3 for further information on the project direction.

¹⁴ 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.

also pleased that some feedback from last year's competition had been taken on board, for example the benefits of the projects to gas customers were better articulated this year.

Ofgem feedback

2.23. We were generally pleased with the project ideas brought forward and agree with the views of the Expert Panel above.

2.24. In the submissions for next year's competition we would encourage companies to demonstrate better how each project fits in with other innovative work and how this links to a wider strategy for the future of the gas networks. We will set out further thoughts in this area shortly as part of our Innovation Review consultation.

2.25. We expect the network companies to consider this feedback, and the more general messages from the Innovation Review, when developing submissions for next year.

3. Next Steps

Chapter Summary

Projects will each receive a project direction in December 2016 and will receive funding from 1 April 2017. We will publish the dates for next year's competition in early 2017.

Future competitions and our Innovation Review

3.1. This year's NIC has been run at the same time as our Innovation Review. We will shortly be publishing a consultation on proposed governance changes to the Gas and Electricity NICs, as well as the Electricity NIC funding level. None of the measures being consulted on affect our NIC funding decisions this year. However, we expect that some of our proposals would (subject to consultation responses) come into effect for next year's NIC, if they are implemented.

3.2. We will be holding an Innovation Working Group meeting on 11 January 2017 to discuss our proposals, including any interactions with the NIC submissions for next year's competition. There will also be an opportunity for network companies to provide feedback on this year's process. If you are interested in attending the meeting please email networks.innovation@ofgem.gov.uk.

3.3. We will look to confirm the Initial Screening Process and full submission deadlines in early 2017. Currently, we expect that they will be similar to the deadlines in 2016.

Funding of selected projects

3.4. 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 2016.¹⁵ We expect the funded projects to start as soon as possible, each according to the terms in its project direction and the NIC Governance Document.

Monitoring of projects and dissemination of learning

3.5. 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.

3.6. The Energy Networks Association has a portal which holds information and learning from innovation projects, including from the Low Carbon Networks Fund (LCNF)

¹⁵ Detail on the funding direction can be found in the Gas NIC Governance Document.

and the Gas and Electricity NICs, and we expect learning from this year's projects to also be made available through the portal.¹⁶

3.7. Finally, network companies have an obligation to hold an annual conference, open to all, where they present what they've learned from their projects (including previously funded NIC schemes). The conference is called the Low Carbon Networks & Innovation Conference. Further information can be found on its website.¹⁷

¹⁶ <http://www.smarternetworks.org/>

¹⁷ <http://www.lcniconference.org/>

Appendix 1 – NIC evaluation criteria

This appendix contains a summary of the evaluation criteria outlined within the Gas NIC Governance Document.

The Expert Panel base their recommendation on each project on the different strengths and weaknesses across all the NIC criteria set out below. They may also consider how the potential project would impact on the overall portfolio of innovation projects funded by Ofgem. We also use these criteria in our assessment.

Degree to which the project:

- Delivers **environmental and financial benefits**: Accelerates the development of a low carbon energy sector and/or delivers environmental benefits whilst having the potential to deliver net financial benefits to future and/or existing customers.
- Provides **value for money** to gas customers.
- **Generates knowledge** that can be shared amongst all Network Licensees.
- **Is innovative** (ie not business as usual) and has an unproven business case (meaning it cannot be funded through another RIIO mechanism) where the innovation risk warrants a limited Development or Demonstration project to demonstrate its effectiveness.
- Demonstrates a **robust methodology** and readiness of the project.
- **Involves other partners and external funding.**
- Is **relevant and timely.**