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RIIO NIC NETWORK INNOVATION COMPETITION

Gas Network Innovation Competition: 2015 funding decision

Decision

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Contact: Tom Mackenzie
Team: Smarter Grids and Governance: Distribution Policy
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 licensees 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 third year of the Gas NIC and there were four applications for funding. We have selected three projects for full funding under the NIC and one project for partial funding. This decision is consistent with the recommendations of our independent Expert Panel. We propose to award almost all of the available £18 million to these projects. If accepted, the network licensees and their partners will provide over £19 million in funding and in kind contributions in 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 toward 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 low carbon and/or environmental benefits as well as cost savings to gas customers in the future.

Associated documents

Gas NIC Governance Document

RIIO-T1 Strategy Decision

RIIO-GD1 Strategy Decision

Contents

Executive summary

Every year, the Gas NIC encourages network licensees to innovate in the design, development, and operation of their networks and to engage with third parties in doing so. It funds a small number of large-scale innovation projects. Network licensees compete against each other for a share of up to £18 million of funding. 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[1] decisions.

The four submissions we received requested a total of £18.4 million of funding. We have selected all four projects for funding – three projects for full funding, and one project for partial funding. We will approve £17.99 million, of the available £18 million. The project proposals were assessed against criteria outlined in the NIC Governance Document.[2]

In reaching the decision to fund four projects, we were advised by an independent Expert Panel, which reviews the project submissions and recommends which projects should be provided with funding. We also appointed Frazer-Nash as consultants, to provide additional analysis and views to the Expert Panel and to us. After careful consideration, we have accepted the Expert Panel's recommendations. We plan to place additional conditions on one project, to ensure it delivers good value to gas customers.

In December 2015 we will issue a project direction explaining the terms that the licensee has to comply with as a condition of funding. The licensee will have to accept this direction before the project can progress.

2015 Gas NIC Projects	**Funding awarded**	**Funding requested**
Customer Low Cost Connections (CLoCC) - aims to minimise the cost and time of connections to the National Transmission System, with particular focus on unconventional gas connections. This will be achieved through challenging every aspect of the connection process. *Submitted by National Grid Gas Plc (National Transmission System) (NGG NTS).*	£4.8	£4.8m
City CNG - will build the UK's first scalable city-based compressed natural gas fuelling station for back to depot city based vehicles. It will use a novel charging arrangement to recover the costs of the high pressure connection over time, and provide a proof of concept business case to enable future private sector investment. *Submitted by Northern Gas Networks (NGN)*	£0.7m	£1.1m
Commercial BioSNG Demonstration Plant - will construct a commercial demonstration plant to produce renewable, low carbon methane (BioSNG) by gasification of household waste. BioSNG could eventually meet 40% of UK domestic gas demand *Submitted by National Grid Gas Plc (Distribution Networks) (NGG DN).*	£5.4m	£5.4m
Real-time Networks - seeks to develop, install and demonstrate a flexible 'real-time' network that would enable the GB gas network to meet current and evolving needs. The project will install and demonstrate sensing technologies, associated hardware and software, and infrastructure, in a representative section of the GB gas network. *Submitted by SGN*	£7.1m	£7.1m

[1]The terms "the Authority", Ofgem", "we", "our" and "us" are used interchangeably in this document. The Authority is the Gas and Electricity Markets Authority. Ofgem is the Office of the Authority.
[2] Our Governance Document and criterion have been formulated in line with our principal objectives and general statutory duties.

1. Introduction

Chapter summary
This chapter describes the background and structure of the Gas NIC, how we and the Expert Panel have evaluated the projects, and the process we followed during this year's competition.

Purpose

1.1. This document explains our decisions on the applications we received for the third Gas NIC.[3] We assessed the projects against the evaluation criteria in the Gas Network Innovation Governance Document, as well as against our principal objective set out in the Gas Act 1986 and against our general statutory duties.[4] We summarise these criteria in Appendix 1.

1.2. We have published other documents alongside this. These are -

- Redacted versions of the full submissions for the projects. We evaluated these against the criteria.
- The independent Expert Panel's recommendation on which projects should receive funding.
- The network licensees' answers to questions raised by us, Frazer Nash (the consultants who evaluated parts of the projects) and the Expert Panel on each project through our formal Q&A process.

The Gas NIC

1.3. Network licensees need to consider how they can tackle climate change while maintaining security of supply and giving customers value for money. Meanwhile, Great Britain's gas and electricity infrastructure needs significant investment to ensure security of supply.

1.4. The Gas NIC encourages network licensees to innovate in the way they design, develop and operate their networks. It is an annual competition which provides funding to a small number of large-scale innovation projects. Network licensees compete against each other for an allocation of up to £18 million of available funding.

1.5. The Gas NIC is open for applications from gas distribution networks (GDNs) and the gas transmission licensee - National Grid Gas Plc (National Transmission System) (NGG NTS). Independent Gas Transporters (IGTs) are also able to apply.

1.6. Customers of the gas network fund the Gas NIC projects. Therefore, a key feature of the NIC is the requirement that learning gained through these projects is disseminated. This ensures that gas customers gain sufficient return on their funding through the wide rollout of successful projects. This return includes financial benefits and carbon and/or other environmental benefits. Even where the funded projects are deemed

[3] This document constitutes both notice of and reasons for our decision as required under section 38A of the Gas Act 1986.
[4] Gas Network Innovation Competition Governance Document.

unsuccessful at the end of their project life, network licensees will gain valuable knowledge that could result in future savings.

Structure of the Network Innovation Competition

1.7. The Gas NIC Governance Document prescribes the governance and administration of the Gas NIC.

1.8. The annual competition starts when network licensees submit project proposals in the Initial Screening Process (ISP). During the ISP, we consider whether these proposals are eligible for funding. Only eligible projects may progress to the full submission stage.

1.9. After the ISP, network licensees are invited to develop the eligible projects into full submissions. An independent panel of experts advises us, but we make the final decision on whether to provide funding.[5] The 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.

The 2015 competition

1.10. This year's competition began with the ISP in April 2015. We received six submissions. One project, submitted by an independent gas transporter, did not pass the ISP stage - Fulcrum Pipeline's Islay Natural Gas Project.[6] We think that this project has some good ideas and some potential to be commercially and technically innovative and would welcome a more developed bid to the Gas NIC next year. NGG DN's Power-to-Gas for Large Scale Energy Storage Applications Project, passed the ISP but did not proceed to the full submission stage. Four submissions met the ISP eligibility requirements and made full submissions by the deadline of 31 July 2015. A brief summary of each project is contained in chapter 2 and all the ISPs and full submissions are available on our website.[7]

1.11. This year, the combined funding requested was £18.4 million.

1.12. The Expert Panel reviewed the network licensees' submissions and consultants' Issues Lists. It also met all the network licensees and their project partners twice. It then evaluated the projects against the criteria in the Gas NIC Governance Document. Where aspects of the submissions required clarification, the network licensees had the opportunity to make the necessary changes and resubmit their proposals. The Expert Panel made its recommendations based on the final submissions. It submitted its recommendation report to us in early November 2015.

1.13. We appointed Frazer-Nash as our consultants for this year's competition. The consultants' role changed this year after we received feedback from the Expert Panel about how best they could add value. Rather than focus on all the assessment criteria, we asked the consultants to assess a limited number of issues with a technical focus. The consultants attended the first bilateral meetings with the licensees, but not the

[5] The biographies of the Expert Panel can be found here.
[6] Further information on our decision can be found here.
[7] Full submissions can be found here.

second. This year we have used more internal technical resource to support the Expert Panel.

1.14. The consultants produced an Issues List which reported, by exception, against each of the criteria the consultants was considering. The network licensees were sent a draft for a factual accuracy check.

1.15. In addition, we, Frazer-Nash, and the Expert Panel asked questions of the companies throughout the process. All of the questions and answers have been published on our website.[8]

1.16. We assessed the projects, taking into account the Expert Panel's recommendations and the evaluation criteria, to decide which projects should receive funding. This assessment is in Appendix 1 of this document.

[8] You can find all the documents from our NIC website - here. This includes the Expert Panel's report, the full submissions, and the questions and answers.

2. Decision

Chapter summary
We have decided to fund all four of the final submissions we received. We have selected three projects for full funding under the NIC. We are making partial funding available for the other project, and we will place additional conditions on this project. In total we are approving just under £18 million of funding. This chapter provides the reasons for our decision.

Overview of full submissions

2.1. This was the third year of the Gas NIC and we received proposals from the gas Transmission Owner and three of the GDNs.

2.2. We were pleased with the project ideas brought forward and the quality of the bids relative to previous years. However, some of the companies could have articulated more clearly some parts of their project. For example, why and how the project is innovative, the benefits to gas customers, and how expenditure relates to key project milestones.

2.3. In several cases we, and the Expert Panel, were pleased to see companies' use of the Network Innovation Allowance (NIA)[9] to fund preliminary work prior to submitting bids to the NIC and, where practical, would encourage this approach for future submissions. It was also encouraging to see that companies have learnt lessons from their previous submissions and that they have chosen to place strong emphasis on recruiting project partners and on stakeholder engagement. The Expert Panel noted that companies should continue to broaden the range of stakeholders involved in the projects, both to provide better qualified benefit assessments and to ensure that successful projects are quickly implemented nationwide.

Table 2.1: Summary of project submissions

Project	Funding requested
Customer Low Cost Connections (CLoCC) Project CLoCC aims to minimise the cost and time of connections to the National Transmission System (NTS), with particular focus on unconventional gas connections. This would be achieved through fundamentally challenging every aspect of the connection process, building on worldwide technology and best practice. *Submitted by National Grid Gas Plc (National Transmission System) (NGG NTS).*	£4.8m
City CNG - will build the UK's first scalable city-based compressed natural gas fuelling station for back to depot city based vehicles. It will use a novel charging arrangement to recover the costs of the high pressure connection over time, and provide a proof of concept business case to enable future private sector investment. *Submitted by Northern Gas Networks (NGN)*	£1.1m

[9] The NIA was introduced as part of the RIIO price controls. It provides funding to RIIO network licencees, either to fund small projects that have the potential to deliver financial benefits to the licencee and/or its customers, or to fund the preparation of submissions to the gas NIC.

Commercial BioSNG Demonstration Plant The Project will construct a commercial demonstration plant to produce renewable, low carbon methane (BioSNG) by gasification of household waste. BioSNG could eventually meet 40% of UK domestic gas demand, resulting in customers being able to benefit from the continued use of the gas network into the future. *Submitted by National Grid Gas Plc (Distribution Networks) (NGG DN).*	£5.4m
Real-time Networks This project seeks to develop, install and demonstrate a flexible 'real-time' network that would enable the GB gas network to meet current and evolving needs. The project will install and demonstrate sensing technologies, associated hardware and software, and infrastructure in a representative section of the GB gas network. *Submitted by SGN*	£7.1m

Our decision

2.4. We have considered the project submissions, the Expert Panel's recommendations, the formal Q&A process, and the consultants' Issues Lists against the competition's framework including the evaluation criteria and against our principal objective and statutory duties. As a result, we have:

- Selected three projects to be funded as submitted (Table 2.2).
- Identified one project for which partial funding will be available, and which will require additional conditions to be agreed by the network licensee before any NIC funding can be spent (Table 2.3). This is to ensure value for money for customers and that their money is being spent efficiently. We explain the additional conditions for these projects below in "Reasons for our decision".

Table 2.2: Projects selected for funding as submitted

Project	Funding Licensee	Funding awarded
CloCC	NGG NTS	£4.8m
Commercial BioSNG Demonstration Plant	NGG DN	£5.4m
Real-time Networks	SGN	£7.1m

Table 2.3: Project selected for partial funding with additional conditions

Project	Funding Licensee	Funding awarded	Funding requested
City CNG	NGN	£0.7m	£1.1m

Reasons for our decisions

2.5. We reviewed each submission against the evaluation criteria in the NIC Governance Document. These assessments are found in Appendix 1. Below we summarise the reasons for our decisions.

Project selected for funding as submitted

Customer Low Cost Connections (CLoCC) – National Grid Gas Plc (National Transmission System)

Overview

2.6. NGG NTS's project proposes to improve the connections process for unconventional gas[10] customers to the NTS. It challenges the entire connections process, looking at:

- processes to meet new customers' requirements
- innovative connection solutions
- information provision (designing a visual online platform which will allow customers to determine good connection locations before submitting a formal request).

2.7. If successful, the project could halve the connection times and costs for gas customers, making more unconventional gas projects viable. Some of the learning should also be directly relevant for connections to the gas distribution network.

Summary of assessment

2.8. This project performed well across the evaluation criteria and was recommended by the Expert Panel for full funding, with which we agree.

2.9. NGG NTS's objective to halve connection costs and time for unconventional gas connections appears credible. If successful, we consider that the project can offer tangible financial benefits to gas customers. NGG NTS conservatively estimates savings of £100m from reduced connection costs over 20 years. These savings should be passed to gas consumers through lower gas prices. Environmental benefits could accrue from enabling more biomethane and biogas projects to connect to the grid, with resulting reductions in GB use of liquefied natural gas (LNG).

2.10. We are satisfied that there is a clear learning dissemination plan in place. Despite NGG NTS not partnering with a GDN, it has sought support for their plans from all the GDNs and has considered where learning will be most relevant to GDNs. We, and the Expert Panel, were pleased to see the level of stakeholder engagement NGG NTS had already carried out. The increased choice for gas connection customers of whether to connect to the NTS or distribution network is valuable, and the online visual platform can be adapted for use by the GDNs.

2.11. There were initially some concerns about how innovative this project was. Following extensive questioning of NGG NTS in this area we, and the Expert Panel, are satisfied that the project is sufficiently innovative. Although the project is not producing substantially new technology, it is linking processes and technologies used in other countries and sectors and combining these in a novel way. The technology may also need to be adapted to be compatible to the GB gas network. The Expert Panel noted that

[10] For example biogas.

NGG NTS's use of NIA funding to investigate concepts before formulating this NIC bid was also good practice. We agree with their view.

Commercial BioSNG Demonstration Plant – National Grid Gas Plc (Distribution Networks)

Overview

2.12. The Project will construct a commercial demonstration plant to produce renewable, low carbon methane (BioSNG) by gasification of household waste. This project builds on NGG DN's Pilot Plant Project that we funded in the 2013 NIC, to test that the process of converting waste to BioSNG is technically viable. Although the Pilot Plant Project is expected to demonstrate this, NGG DN has identified that private investors will still be reluctant to invest in this type of plant until a larger scale facility has proved, through continuous operation of a plant, its viability as an alternative to fossil fuel based gas sources. This project will allow stakeholders to understand the risk and rewards of building similar plants.

Summary of assessment

2.13. The project has several strengths and performed well against all the criteria.

2.14. We, and the Expert Panel, consider that this project represents good value for money for gas customers by leveraging substantial external funds (around four times that of NGG DN's NIC funding request) from DFT and a project partner. Without the NIC funding the project would enable BioSNG use for transport only. The NIC funding substantially enhances the value of the project by allowing the gas to be connected to the distribution network and used for heat – arguably the more efficient and beneficial use of this gas.

2.15. If successful, the benefits (both environmental and financial) of the use of BioSNG for heat are largely in line with those that were identified as part of the Pilot Plant Project. While this project does not increase the magnitude of the benefits, it is expected to increase the likelihood of them being realised by building on the learning from the Pilot Plant Project.

2.16. The environmental case for the project is strong. If the roll-out of BioSNG occurs, carbon savings could be between 30 and 35 million tonnes per annum from 2050, depending on whether the gas is used for heating or vehicles. There are also potential financial benefits to gas customers. If successful, the lower cost of BioSNG is expected to pass through to customers via the substitution away from more expensive alternative gas sources. Gas customers will also benefit from the avoided capital cost of alternatives of reducing carbon emissions such as electrification or heat pump installation. Some financial benefits to GDNs are also estimated through reduced NTS exit charges.

2.17. We and the Expert Panel had some concerns that this project is planned to start before the technical case of creating BioSNG is proven under the Pilot Plant Project. While it would be preferable to wait until the Pilot Plant Project is completed before commencing on the next stage of demonstration, given the availability of the external funding, it makes sense to go ahead with the project now. We consider that the stage gating of the project is adequate to ensure that the spending of NIC funding is limited until the success of the Pilot Plant Project is demonstrated. We will monitor this carefully as the project progresses.

Real-Time Networks – SGN

Overview

2.18. SGN, and their project partner DNV GL, plan to create a new modelling technique which accurately measures energy within the gas network. Through combining sensors within the network and customer premises, with external data on local weather conditions and consumer behaviour, SGN will create a bespoke software package which is representative of the modern gas network. By proving the effectiveness of this new methodology, SGN aim to create a tool which can be utilised across the entirety of the GB network.

Summary of assessment

2.19. The Real-Time Networks project performed well across all of the evaluation criteria and we plan to fund the project as submitted.

2.20. We consider that, if successful, this project could create an improved methodology for modelling the GB Network. Through developing an understanding of the energy within the network, the project can potentially provide carbon savings through reduced network leakage. The project also has the potential to produce other material environmental benefits such as the increased ability to accept and better manage more unconventional gas sources at a lower cost.

2.21. If successful the project is also expected to deliver tangible financial benefits to gas customers. For example, an improved understanding of the network would reduce the need for street works, and for the alteration of unconventional gases with Nitrogen which is costly for consumers.

2.22. We believe SGN's decision to use funding from the NIA to run a competition to select their project partner prudent and a good way of ensuring value for money for consumers. We also believe the proposed royalty agreement could also add additional value to the project for gas customers.

2.23. If the project is successful, the Real-Time solution has the potential to be utilised across the GB Gas Network. We are pleased to see SGN had consulted other network operators whilst drawing up the project but shared the Expert Panel's disappointment that only one letter of support was obtained.

2.24. Whilst we consider this project to be a well thought out we, and the Expert Panel, had some concerns regarding the Customer Engagement aspects of the project. This issue was explored as part of decisions with SGN. The setting of a go/no go stage gate and Successful Delivery Reward Criteria (SDRC) around Ofgem's approval of their Customer Engagement Plan has mitigated this concern. SGN were also challenged on how innovative this project was given known projects exploring similar things in other countries. This was challenged by us, the Expert Panel, and our consultants during the evaluation process and we satisfied that this project is innovative.

Project selected for partial funding with additional conditions

City CNG – Northern Gas Networks

Overview

2.25. NGN's City CNG project would build the UK's first scalable city compressed natural gas fuelling station for city-based vehicles. The project's innovation lies in trialling a novel charging arrangement for the station's high pressure connection, whereby the costs of the connection are spread over ten years rather than charged upfront. By providing a proof of concept business case for CNG stations, this could help future private sector investment across Great Britain.

2.26. The project's work in trialling the novel charging arrangement will also help inform the potential for amendments to current network connection charging arrangements to aid environmentally beneficial and/or low carbon technologies and initiatives.

Summary of assessment

2.27. The widespread take-up of CNG vehicles would bring considerable environmental benefits, with significant reductions in emissions and associated air quality and public health improvements. We, and the Expert Panel, saw this as a project strength. We also note how timely and relevant a drive to switch to cleaner fuels is, and were impressed by the commitment of Leeds City Council (LCC) as a project partner.

2.28. However, alongside its clear strengths, the project also showed some weaknesses against several of the evaluation criteria. In particular, NGN's submission could have explained better the commercial/regulatory barriers that the project seeks to address in gas charging arrangements. This lies at the heart of the project's innovation, and the project would have benefitted from a clearer and more detailed description of how these barriers would be overcome and how the learning may be applied by others. This view was broadly echoed by the Expert Panel.

2.29. We, and the Expert Panel, consider that the project could deliver its key innovation objectives of exploring a novel charging arrangement using a lower cost connection site, with considerable savings to the project cost. We recognise that NGN may still wish to proceed with the more expensive site. If this is the case, NGN or its project partner will need either to increase their own contribution to the project or obtain additional funding from another source.

2.30. Given these concerns, this project might not ordinarily have been put forward for any NIC funding. However, we and the Expert Panel feel that at a high level, the project has real merit and warrants some funding (subject to conditions) under the NIC. In particular, we strongly welcome work done by industry to explore novel charging arrangements. It is an area in which network companies have done little innovative thinking in the past and we consider that this project's learning could potentially be of industry-wide value and not just for gas. The project also has the potential to facilitate connections for other applications with less mature technologies and/or customer bases – many of which may promise environmental/low carbon benefits.

2.31. For these reasons, we have accepted the Expert Panel's recommendation that the project should receive partial funding under the NIC. We agree with this

recommendation. Our decision is therefore to provide partial NIC funding, along with conditions that NGN will need to meet before it can use any NIC funding. The conditions are to articulate better the learning objectives and deliverables relating to the novel charging arrangement and to change the figures in its submission to reflect the revised level of funding. We consider that this is a prudent response to the concerns outlined above.

2.32. In order to ensure that the project can progress and deliver valuable learning to other network companies, we would be happy to work with NGN to clarify and strengthen its submission in line with the conditions above.

Customer issues in running the projects

2.33. SGN's Real-time networks project selected for funding will have a direct impact on customers. Successful delivery of the project will involve gathering consumer usage data from both domestic/ non domestic premises. This will involve installing some equipment in customers' premises as well as managing their data. We have explored this with the Expert Panel, as part of the decision making process. We are satisfied that this project has appropriate plans and mitigations in place to prevent an adverse impact on customers. In particular, SGN will need to submit a robust customer engagement plan and data protection strategy for our approval before assessing customers' premises and using their data.

2.34. We do not expect the other projects selected for funding to have any significant direct customer impact during trialling.

3. Next Steps

Chapter Summary
Projects will receive their project direction in December 2015 and will receive funding from 1 April 2016. We will publish the dates for next year's competition in early 2016.

Funding selected projects

3.1. Before funding a project, we issue a project direction explaining the terms that the funding licensee has to comply with as a condition of funding.[11] We are currently preparing project directions for the successful submissions and we will issue draft versions of these to funding licensees shortly. The project direction for NGN will include the additional conditions outlined in chapter 2 and Appendix 1 of this document.

3.2. Once all the funding licensees have decided whether to accept their project direction, we will issue a funding direction. This will specify the amount of money the NTS System Operator will be allowed to recover from its customers over the next regulatory year to fund the successful NIC projects. The funding direction will require those funds to be transferred to the relevant network licensees in order to fund the selected projects. We will issue the funding direction in time for the NTS System Operator to prepare its indicative use of system tariffs at the end of December 2015.

3.3. Although funding will not be raised until the next regulatory year (starting on 1 April 2016) we expect the funding licensees to start their projects as quickly as possible, according to the terms in their project direction and the NIC Governance Document.

3.4. We will monitor projects to ensure they are implemented in line with the full submissions. Each funding licensee will have to provide a detailed report, at least every six months, to allow us to evaluate the project's progress. We will publish these on our website to make project learning available to all interested parties. Funding licensees should also share their project's learning according to the plan set out in their project submissions. In addition, funding licensees, including those from last year, must hold an annual conference, open to all, where they present what they've learned from their projects. Finally, the Energy Networks Association has developed a portal which holds learning from innovation projects, including from the Low Carbon Network Fund (LCNF) and the Gas and Electricity NICs, and we expect learning from this year's projects to be made available through the portal.[12]

3.5. Network licensees are incentivised to deliver the projects to a high standard. They will be eligible to apply for a reward if they meet the delivery criteria in the project direction. This is designed to reward those projects which are well managed and completed to at least the standard that could be expected from the full submission.

[11] The terms 'project direction' and 'funding licensee' are defined in the Governance Document.
[12] Please see Smarter Networks portal here.

Future competitions

3.6. As explained in chapter 2 of this document, we had some concerns about certain areas of this year's submissions. We expect licensees to consider these when developing submissions for future competitions.

3.7. The Expert Panel also provided both general and project-specific views on the quality of the submissions in its 2015 recommendation report. We ask network licensees to take these points into account when developing their submissions for future competitions.

3.8. We plan to consult shortly on the NIC governance arrangements. The outcomes of this consultation alongside any specific lessons from this year's process may lead to changes to the Governance Document.

3.9. We will confirm the ISP and full submission deadlines in early 2016. We expect they will be similar to the deadlines in 2015.

Appendix 1 – project evaluations

This appendix contains our detailed evaluation of each project against the Gas NIC evaluation criteria. The Governance Document explains the terminology, the evaluation criteria and our evaluation process in full, but here is a summary:

Degree to which the solution being trialled:	**Degree to which the project:**
• 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 network customers. • Generates knowledge that can be shared amongst all network licensees.	• Is innovative (ie not business as usual) and has an unproven business case 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.

Customer Low Cost Connections (CLoCC)

Project overview

NGG NTS proposes to review and develop a new process which allows the connection of small and unconventional gas projects to the National Transmission System (NTS). If successful, the project will halve the costs and time (currently around £2 million and 3 years) of typical connections to the NTS. This project is expected to enable more entry and exit projects to become viable.

The current connection process has been designed for traditionally large projects, for which the time and cost of a connection have a small impact on the total project. The types of project inquiring about NTS connections are changing and NGG NTS has identified the opportunity to provide an improved process. Under current regulatory arrangements, NGG NTS passes-through the costs of the connection to the customer. This provides limited incentive from it to be innovative in this area at a pace and scale that is beneficial for changing customer requirements.

The project is a complete review of the connections process, incorporating and developing standardised solutions wherever possible. It will demonstrate 'best in class' technology and practice, while ensuring compatibility with the stringent requirements of the NTS. In particular, the use of a standardised above ground connection will allow cheaper off-site construction of the constituent parts. NGG NTS will also develop a visual online platform which will help customers choose the most appropriate location for their connection with analysis they can access at the pre-planning phase, reducing money wasted on studies relating to unfeasible sites. This software will also be available for GDNs to adapt.

(a) 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

The project could deliver some carbon and environmental benefits, although this depends on the types of projects that choose to connect using the new process. If rolled out, the project is also expected to achieve significant cost savings in the supply chain.

Low carbon and/or environmental benefits

The carbon benefits of this project are challenging to quantify with certainty as they depend significantly on the type of projects that become viable, and on further development of other uses of gas, for example in vehicles. Nevertheless, the assumptions to calculate the benefits appear reasonable.

The main carbon benefit quantified by NGG NTS relates to the connection of indigenous gas supplies thus reducing the amount of LNG that has to be imported, and the associated environmental costs. NGG NTS predicts that, were LNG to be completely displaced by 2050, around 82 million tonnes of CO2 could be avoided. NGG NTS noted that meeting the UK's decarbonisation targets and the government's Carbon Plan[13] will

[13] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf

be likely to require an increased dependence on gas and an increased indigenous production. This project would be expected to help facilitate this.

NGG NTS also notes that gas powered vehicles have the potential to significantly reduce the CO2, NOx and particulate emissions in the transport sector, so developing improved exit connections also brings environmental benefits.

The better utilisation of the NTS, avoiding reinforcements which might otherwise be required in connection to a distribution system and the amount of work which will be able to be completed off site, is also expected to improve the environmental impact of connections to the gas grid.

Net financial benefits

If rolled out, the new connections process is expected to achieve significant cost savings in the supply chain. The savings in connection costs would accrue directly to the customer requiring the connection. However some of these savings would be expected to then be reflected in lower gas prices to end consumers.

NGG NTS has predicted that there could be savings of £100 million to the gas supply chain, over 20 years, through low cost connections to the NTS. NGG NTS considers that this is a conservative estimate.

In addition, if the project is successful, the learning and elements of the connection solution will be applicable to GDN connections and could therefore reduce connection costs within the distribution network.

(b) Provides value for money to gas customers

We, and the Expert Panel, are satisfied that this project provides value for money to gas customers. The alternative to connecting to the NTS is connecting to the distribution networks, which may not always be practical, have capacity limitations, and other costs may be incurred by the customer if the connection isn't ideal. If learning from the project is rolled out, the additional choices available to customers will allow them to choose the best value option.

We questioned whether the amount to be spent on the visual online platform provides good value for money. Based on NGG NTS's explanation of the functionality of the visual online platform, we agree that it will be valuable to customers connecting to the network and the GDNs.

NGG NTS has justified the costs of the project and the project plan demonstrates appropriate control of spending. We feel the project costs are reasonable for the scope of work to be undertaken.

(c) Generates knowledge that can be shared amongst all relevant Network Licensees

Although NGG NTS has not partnered with a GDN on this project, it has provided evidence of support for the project from all the GDNs. It has also built in learning dissemination, through challenge and review sessions, conferences, publications, and a

website, into its project plan and SDRCs. The Expert Panel considers that the dissemination plan is well thought through.

NGG NTS has committed to producing a visual online platform which can be adapted for use by the GDNs thus potentially increasing its relevance and value. GDNs have also indicated that they expect the learning from the implementation of skid units to be applicable to GDN connections.

We are pleased that the project will conform to the default intellectual property rights (IPR), allowing all licensees and other interested parties to use all knowledge gained from this project elsewhere on the gas network.

(d) Is innovative (ie not business as usual) and has an unproven business case where the innovation risk warrants a limited development or demonstration project to demonstrate its effectiveness

We are satisfied that the project is sufficiently innovative. Although the project is not producing substantially new technology, it is linking a number of processes and technologies used in other countries and sectors. Based on our and the Expert Panel's questioning of NGG NTS, we consider that the combination of these technologies has not been undertaken before, and the technology may need to be adapted to be compatible to the GB gas network.

(e) Involvement of other project partners and external funding

We and the Expert Panel are satisfied with the choice of the three project partners. The two engineering companies will be developing the connections technology while the software company will be developing the visual online platform. The process to identify the project partners was competitive, ensuring quality and value for money. All three partners have significant experience in the applicable project areas, and some have worked with NGG NTS before. We are confident that NGG NTS will be able to manage the project appropriately, as it has a robust project plan in place.

The project has no external funding.

(f) Relevance and timing

The project is relevant. Given the number, and changing nature, of projects which NGG NTS suggest could become viable, it is important that the connections process is robust. Quicker and more efficient connection of unconventional gas is relevant to helping GB meet its decarbonisation targets. Once the methodology has been proved, it will be expected to be incorporated into NGG NTS's business as usual work.

The relevance of this project to biogas and biomethane projects in connecting to the grid has been explored through NGG NTS's connection enquiries process, as well through a small customer survey. This indicated that the time taken to complete the connection is the most important factor for unconventional plant, with cost being a secondary consideration.

(g) Demonstration of a robust methodology and that the project is ready to implement

We are satisfied with the methodology, project plan and programme governance provided. NGG NTS has clearly laid out how the project will be implemented in a timely manner and how the project will be adequately resourced. NGG NTS has identified risks, with the highest risk being the technological proof of the skid units. This is why the project requires external funding rather than being something an individual customer will pay for. Some customer engagement has already been undertaken to ensure NGG NTS understands customer requirements, covering a range of types of stakeholders.

The project does not have direct impact on gas consumers as the project is being undertaken on a NGG NTS test site and will not interrupt gas flow.

The project plan has clear milestones, with three distinct phases, making it easier to manage and identify upcoming problems. The SDRCs are appropriate, and if met will reflect a successful project.

Commercial BioSNG Demonstration Plant

Project overview

This is a three year project to develop a plant that demonstrates the commercial conversion of waste into synthetic biogas (BioSNG), and input of that gas into the distribution network and natural gas-powered vehicles. This project builds on the Pilot Plant Project which the 2013 NIC supported[14]. This Pilot Plant Project is under development, and is scheduled to be completed in 2017. NGG DN has identified that the Pilot Plant Project does not sufficiently demonstrate the continuous operation of a commercial sized plant, which would be necessary before significant external investment in BioSNG projects could be justified. NGG DN has determined the size of project which is needed to demonstrate this, and have secured Department for Transport (DFT) and other external funding to build the plant and demonstrate the use of the gas in vehicles. The NIC funding will extend the scope of the project to include injection of the BioSNG into the gas distribution network.

The NIC funding will enable the project to explore the technicalities associated with making a connection to the distribution network. The project will also demonstrate the ability of a BioSNG plant to operate consistently and reliably, to show its viability as an alternative to fossil fuel based gas sources. This includes achieving and monitoring the correct quality of gas for injection in the network, which is different from the quality required for vehicles.

(a) 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

This project has significant potential to facilitate the development of a low carbon economy. The purpose of the project is to determine replicable technology and commercial structures. If successful, NGG DN estimates that by 2050, there could be up to 100TWh per annum of BioSNG produced by various commercially operated plants, which could generate significant financial and environmental benefits.

It is important to note that the roll-out benefits (both environmental and financial) for the use of BioSNG for heat are largely in line with those that were identified as part of the Pilot Plant Project. While this project does not increase the magnitude of the benefits, it is expected to increase the likelihood of them being realised. The project also adequately demonstrates the benefits of BioSNG in transport.

Low carbon and/or environmental benefits

The Carbon Plan identifies the need for low carbon heat and transport in order to meet the targets. If NGG DN's prediction of 100TWh per annum of BioSNG by 2050 is met, and this gas was used solely for heat, there could be resulting carbon savings of over 30 million tonnes of CO2 per annum. This is substantial against current emissions of around 80 million tonnes per annum from residential gas usage. If the 100TWh of gas was used only for transport, savings in excess of 35 million tonnes of carbon per annum may be achieved. NGG DN's modelling of the environmental benefits has been challenged as part

[14] https://www.ofgem.gov.uk/sites/default/files/docs/2013/11/decision_on_the_first_year_of_the_gas_network_innovation_competition_0.pdf

of our review process and we are satisfied that reasonable steps have been followed to ensure that the best available evidence has been used.

We agree with NGG DN's assessment that because the roll-out of the commercial BioSNG plants is not dependent on changes to consumer behaviour and does not require additional network infrastructure, it has the potential to accelerate the move to low carbon heat more quickly than electrification of heat or the development of heat networks, and at less cost. NGG DN also proposes to compress the gas for use as a low-carbon fuel for transport. They accept electrification of vehicles has a role to play in decarbonising this sector, but believe this fuel has advantages for HGVs and buses, because of the low mass, energy-dense storage required.

The project is not expected to release capacity at the distribution level. NGG DN notes that transmission capacity could be released by BioSNG plants connecting to the distribution network. GDNs would be able to offset the volume of exit capacity booked from the NTS with gas from BioSNG plants connected to the distribution network, thus releasing available capacity to the NTS.

Net financial benefits

By using the 2015 Future Energy Scenario[15] 2030 prices of £30/MWh of fossil fuels, compared with £18/MWh for BioSNG, there is a cumulative saving of £0.4 billion by 2030, if an annual production of 37TWh of BioSNG is achieved. This cheaper gas will likely result in a pass-through of lower costs to end consumers.

Alternatives to renewable gas, such as electrification, will require additional investment in electricity network infrastructure, whereas BioSNG can use the existing gas networks. If BioSNG was rolled out, the UK could be closer to meeting its carbon targets without having to invest in new infrastructure. NGG DN estimates the cost savings from 7 million properties (which could be served by BioSNG) not having to replace their gas boiler with an air-source heat pump could be £28bn over 25 years.

NGG DN also provides quantification of the benefits carried out independently by the National Grid Energy Strategy and Policy Group.

(b) Provides value for money to gas customer

If rolled out, the lower cost of BioSNG will likely be passed through to gas customers through substitution away from more expensive alternative gas sources. Gas customers will also benefit from the avoided capital cost of alternatives such as electrification or heat pump installation.

Because of the large amount of external funding, this project allows the demonstration of injecting BioSNG into the gas grid at a much lower cost to the gas customer than if this project were to be undertaken separately at another time and be fully funded by NIC. The project will also benefit from learning from the Pilot Plant Project.

The Expert Panel consider that the plant is at an appropriate scale, and that the project is addressing the right questions, to allow commercialisation of BioSNG in the future. A

[15] http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Future-Energy-Scenarios/

competitive process will be used for procurement which will help to ensure that the project is delivered at competitive cost.

(c) Generates knowledge that can be shared amongst all relevant Network Licensees

NGG DN is partnering with Wales & West Utilities (WWU) who will connect the project to their network. The learning from this project will be directly relevant to other distribution network operators when designing their connection offers to BioSNG projects, and potentially other similar connection requests.

The knowledge generated will also benefit a range of other stakeholders. This project will demonstrate BioSNG production at a commercial scale. NGG DN has identified that the learning will include how to construct a facility, the performance guarantees which could be given, example contracting structures, the revenues and costs of the plant, grid network entry agreements and associated costs.

NGG DN has identified a wide range of parties with an interest in the project. NGG DN will use a variety of techniques including a visitors centre, website, events and writing technical papers, to tailor their messages to the relevant audiences. All the project partners will meet the default intellectual property rights.

(d) Is innovative (ie not business as usual) and has an unproven business case where the innovation risk warrants a limited development or demonstration project to demonstrate its effectiveness

We consider that the project is innovative, as the use of waste derived feedstock, which contains contaminants and thus has variable composition, at a commercial scale is unproven. The Expert Panel also agrees that the continuous supply of grid gas from these sources has not been demonstrated at this scale. Although the Pilot Plant Project is underway, this will not demonstrate the dependencies between commercial waste contracts, the performance of the plant and the requirements of the network.

There is no commercial benefit to NGG DN, and as this demonstration plant will not provide a return, it cannot secure external finance. There are a number of parties who will provide the majority of the project funding, and the NIC funding will allow the extension of the project scope from only use in vehicles to include gas into the grid.

(e) Involvement of other project partners and external funding

We are satisfied with NGG DN's selection of its project partners. We consider it appropriate that it has chosen to utilise the existing Pilot Plant Project consortium of NGG DN, Advanced Plasma Power (APP) and Progressive Energy Limited (PEL). This partnership builds on a track record of collaboration helping to mitigate some of the risks associated with the project and facilitate the sharing of knowledge from the Pilot Plant Project into the construction of the new plant.

To assist with the connection of biomethane into the network, NGG DN has also sought out new partners – WWU and CNG Services. It is our opinion that the additional expertise offered by these organisations will be beneficial to the project.

The project has secured substantial external funding – around four times that of the NIC funding request. NGG DN has successfully applied for a grant of £10.6 million from the DFT under the 'Advanced Biofuels Demonstration Competition.[16] APP have also provided an additional £6.5 million in funding.

The Expert Panel notes that the partnerships and external funding are strong.

(f) Relevance and timing

We consider that the project is both relevant and timely. Without the NIC funding, the project will only explore the use of BioSNG for transport using the funds it has secured from the DFT. The additional NIC funding substantially enhances the value of the project by also facilitating the gas to be connected to the distribution network and used for heat too. There is ongoing debate about the best way to meet our decarbonisation targets on the heat side, and demonstration of the commerciality of this option will provide useful input to these discussions.

We, and the Expert Panel, had concerns regarding the risks of funding this project prior to the Pilot Plant Project's completion. This has been discussed with NGG DN to ensure the stage gating of the project limits the level of NIC funding that is committed to the project until the 'success' of Pilot Plant Project is demonstrated.

(g) Demonstration of a robust methodology and that the Project is ready to implement

We support the Expert Panel's opinion that the project is based on a robust methodology. We are confident that a strong project team and plan are in place.

The project has a detailed project plan listing key milestones, which appears well thought out and ready to implement. The submission has been based on the learning generated by the Pilot Plant Project with key milestones for the project and strict time constraints for each aspect of the plan – including appropriate stage gating as noted under criteria (f) above.

The risk register submitted by NGG DN is detailed and includes appropriate mitigation measures. The circumstances under which the project's steering committee could potentially suspend the project have been clearly set out and tied to the project plan.

NGG DN has clearly identified the resources required to complete the project and have sought out quotes as part of their preparation for the bid. We welcome this preparation and believe it will enable the project to progress in a timely fashion.

The Expert Panel feel that the review at stage gate SDRC 9.2 is sufficiently robust to ensure that the project does not continue if the Pilot Plant Project proves to be unsuccessful. Aside from this they are satisfied that the SDRC are sufficiently challenging and, if met, will demonstrate the successful delivery of the project.

[16] https://www.gov.uk/government/speeches/advanced-biofuels-demonstration-competition-grant-award

Real-time Networks

Project overview

This is a three year project to create a new, and more efficient, method of modelling gas flow across the GB network. SGN plan to demonstrate a real-time gas network for the future which is flexible, secure, cost effective and safe. If successful, they will create a bespoke software package and novel cloud solution which will use sensors in the network/ consumers premises' to monitor in real-time the gas quality (calorific value (CV)), flow and pressure of the GB gas network. This will enable future monitoring of the network to focus on the energy within the system rather than the current practice of measuring gas volume.

Currently the methods used to model gas flow across the GB network are based on the outdated assumption that all the gas is of the same origin and quality. In recent years there has been a marked change in both of these factors owing to the move towards unconventional gas sources and changes in consumers' use of the gas network. This means the existing methodology used to predict the gas flow across the network is no longer representative of the real world conditions. As these models are used by network operators when calculating the required network reinforcement for new connections/changes in gas usage, better modelling has the potential to reduce network costs for gas customers by reducing unnecessary works.

Through creating a real-time network monitoring system SGN hope to create a system which will enable network operators to measure the energy flowing through the system, gaining a better understanding of the required capacity. They also hope to develop a better understanding of how gas from unconventional sources acts within the system, potentially reducing the need for costly processing techniques to bring the gas to predetermined standards, which is costly.

The project intends to create a stream of real-time data and associated data analytics in order to develop an understanding of network operation which has not been previously achieved on the GB Gas Network.

(a) 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

We consider that this project could be a significant step towards accelerating the development of a low carbon energy sector and delivering net financial benefits to customers. The Expert Panel broadly agree with this.

Low carbon and/or environmental benefits

The Carbon Plan identifies a role for unabated gas in the transition to a low carbon future as gas will continue to play a significant role in the GB energy mix. The project has been able to quantify a number of the potential carbon impacts of a real-time network including reduced leakage[17], which if rolled out could lead to cumulative carbon savings

[17] If successful, the project may enable a redefined 1:20 peak condition and associated off peak diversification, to reduce network pressure. Reduced network pressure leads to reduced gas leakage.

of 262 Mt by 2050. This is the largest environmental benefit offered by the submission although SGN have also identified, but not quantified, carbon benefits in several other areas.

Non-carbon environmental benefits include the reduced need for nitrogen ballasting. At present there is a requirement to add Nitrogen to LNG in order for it to meet gas quality standards. This is not only expensive, but also has a significant environmental impact associated with the manufacture of nitrogen. Through redefining the way in which mains replacements projects are designed, the project also has the potential to reduce the amount of material being sent to landfill by decreasing the number of street works required to maintain the network.

Finally, this project could accelerate the development of the low carbon energy sector by helping to facilitate the use of a wider range of low carbon gases in the network while managing it in a more efficient manner. The project also intends to model the impact of a future in which new low carbon technologies create a more flexible and integrated relationship between the gas and electric networks (for example hybrid heat pumps).

Net financial benefits

The project identifies several areas in which a real time network could deliver financial benefits to GDNs.

The Panel highlight the main financial benefits of the project as the reduction in LNG production costs due to the removal of the need for nitrogen ballasting, lower capacity exit bookings and the reduction in network replacement expenditure.

We consider that SGN's modelling and assumptions are acceptable and that the potential financial benefits outweigh the project's costs.

(b) Provides value for money to gas customers

The Expert Panel were impressed by SGN's decision to utilise funding from the NIA to run preliminary feasibility studies and the competitive process used to identify a partner for the scheme. We agree with this finding.

The proposed royalty arrangements gave both us and the Expert Panel confidence that gas customers could also potentially benefit from any software products and IPR which are developed as part of this project.

(c) Generates knowledge that can be shared amongst all relevant Network Licensees

The Expert Panel were pleased by SGN's decision to engage with a range of stakeholders as part of their pre-submission activities, but were disappointed that they only obtained one letter of support. We agree with the Expert Panel and SGN should consider this in any future submissions under the NIC.

SGN have sought to ensure that the learning can be scaled across the GB through trialling the proposed methodology at a number of sites to gain data which is reflective of the network as a whole. Although SGN have chosen to measure consumer data using

their own data loggers they have also recognised the potential use of smart meter data in the future. This was explored by us and the Expert Panel. We are satisfied that in the future smart meter data can be integrated into the models produced by the project.

SGN have also stated that they intend to mirror their dissemination activities from their other innovation projects so will create a website and provide regular updates to Industry partners. We believe this will enable them share their learning as the project progresses.

(d) Is innovative (ie not business as usual) and has an unproven business case where the innovation risk warrants a limited development or demonstration project to demonstrate its effectiveness

We are satisfied that the project is innovative. As part of the review process we, the Expert Panel, and our consultants had a number of discussions regarding this.

The Expert Panel consider this project to have a number of innovative aspects. The update of demand models, ability to simulate energy flows and the better understanding of the impacts of downstream renewables could lead to a comprehensive change in the industries existing processes.

We agree with the Expert Panel on this point and would add that the combination of the technology and modelling techniques could be considered as innovative with relation to the unique challenges of the GB gas network such as the comparatively low flow pressures used within local networks. We also consider it unlikely that the project would proceed without NIC funding as a number of its benefits relate to future gas strategy rather than current business as usual practices.

(e) Involvement of other project partners and external funding

Both we and the Expert Panel consider SGN's selection of DNV GL as the principal partner for the project to be satisfactory. This organisation is able to provide the project with the benefits of their understanding of renewable metering/monitoring. In addition to this the Expert Panel were impressed by SGN's novel use of NIA funding to run a competition to identify the best partner for this project.

SGN have identified the service provider for the novel cloud solution contained within the proposal. There were some concerns with regards to the data protection for this information however, SGN have provided additional information to allay these concerns and demonstrate sufficient consideration of the potential challenges in this area. This project has only secured a nominal amount of external funding. The Expert Panel find this disappointing considering the potential value of participating in the project for DNV GL and the equipment suppliers.

(f) Relevance and timing

We believe this project to be highly relevant in light of the changing use of the GB gas network with the reduction in indigenous UK Continental Shelf gas supply, the move towards unconventional gas sources and likely changes in consumer behaviour. If successful, this project will lead to a better understanding of these challenges as well as delivering a more efficient network management tool.

SGN stakeholder engagement has identified a number of parties who would find the predicted outcomes of the project relevant, including a number of GDNs who have shown their support for this project and its learning. The Expert Panel agree with these findings and believe it is imperative that the other GDNs are kept informed of the project's progress so that it can be implemented as soon as possible.

(g) Demonstration of a robust methodology and that the project is ready to implement

We believe that the project is based on a robust methodology and are confident that it is ready to implement.

The project plan clearly identifies the key deadlines and the processes required to meet them. The responsibilities of each party have been clearly laid out and SGN have set comprehensive go/ no go stage gates which they were able to clarify further during the question sessions with the Panel. The information provided during these meetings, combined with the fact site survey work was carried out prior to submission helped to convince the Panel that the project was well designed.

An area of concern for both us and the Expert Panel were the potential risks associated with the parts of the project that involve customer engagement. As the successful delivery of the project will involve gathering customer usage data from both domestic non-domestic premises the Panel felt that SGN needed to do more work in order to understand the population specifics of the study area. While SGN were able to demonstrate that they had learnt lessons through their 2013 NIC project 'Opening up the Gas Market'[18] the Panel expects them to submit a robust Customer Engagement and Data Protection Plan to Ofgem before the associated stage gate can be completed.

[18] https://www.ofgem.gov.uk/publications-and-updates/gas-network-innovation-competition-submission-scotia-gas-networks-opening-gas-market

City CNG

Project overview

This is a four year project to build the UK's first scalable compressed natural gas (CNG) fuelling station for city-based vehicles. The project's innovation lies in trialling a novel charging arrangement for the station's high pressure connection, whereby the cost of the connection is spread over ten years rather than charged upfront. Of the £1.1m that NGN has requested, there is the potential that, over ten years, a substantial proportion of the NIC funding will be returned to consumers if the fuelling station becomes economically viable.

By providing a proof of concept business case for CNG stations, future private sector investment could be enabled around the country. The project's work in trialling the novel charging arrangement will also help inform the potential for amendments to current network connection charging arrangements that may better facilitate the development of environmentally beneficial and/or low carbon technologies and initiatives. NGN will also seek to resolve some of the technical complexities surrounding the design and build of a high pressure connection to a CNG fuelling station.

(a) 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

3.11. This project has significant potential to accelerate the development of a low carbon economy. The UK does not currently have any CNG fuelling stations that could accommodate the large-scale conversion of city-based vehicles away from more polluting, conventional fuel sources.

Low carbon and/or environmental benefits

The Expert Panel felt that the environmental benefits had been set out clearly and were satisfied that, by replacing city depot-based diesel and petrol vehicles with CNG vehicles, the project would deliver significant environmental and air quality benefits. We agree with the Expert Panel's view. CNG reduces particulate matter (PM_{10}) by 100%, Nitrogen Oxide (NO_x) by circa 90% and carbon emissions by circa 22% compared with diesel vehicles. The government's Carbon Plan cites CNG as being a technological option and therefore this project will help contribute to the plan.

Net financial benefits

3.12. Should NGN convert 60 vehicles, as set out in its submission, this could reduce its costs by around £57,600 per annum, with around £20,000 of this flowing directly back to its customers and delivering some modest financial savings. If CNG stations are rolled out across GB as a result of this project's learning, then the direct financial benefits for all gas network customers would be far more substantive.

(b) Provides value for money to gas customers

There is a good financial case for providing some NIC funding based on the project's net benefits. Under the project, a substantial proportion of the funding is expected to be

returned to consumers The underlying assumptions appear to be reasonable and have been challenged as part of the review process to ensure that there is a firm baseline demand for the station from LCC and NGN. This increases the probability that the majority of NIC funding will be returned to customers. Following our Q&A process, NGN has also extended its commitment by undertaking to convert a minimum of 15 vehicles if the project goes ahead.

We agree however, with the Expert Panel that the project could meet its innovation objective of demonstrating the viability of the novel charging arrangement at a lower cost site, with savings to the project cost of over £200k. This was one of the reasons behind our decision to award partial funding of £700k.

We recognise that NGN may still wish to proceed with the more expensive site. If this is the case, NGN or its project partner will either need to increase their own contribution to the project or obtain additional funding from another source.

(c) Generates knowledge that can be shared amongst all relevant Network Licensees

The project proposes to generate knowledge that can be shared amongst other GDNs in 2 key areas.

The first covers the technical complexities of connecting a CNG station to the high pressure network. This has not been done for a city-based fuelling station in the UK before. NGN seeks to provide evidence for high pressure connection sizing, associated metering and other downstream complexities. However, we understand that this is an area where some work has already been done on the medium pressure network – a point also noted by the Expert Panel.

The second, more significant area of knowledge generation covers the novel charging arrangement for the high pressure connection. Typically, the full cost of a connection would have to be paid before the connection is commissioned – an arrangement that is predicated on the existence of a stable and relatively mature customer base. Under NGN's project, however, payments for the connection cost will be spread over time and linked directly to the performance of the fuelling station. We note that soft market testing has revealed that the high upfront cost of the connection to the gas main is a significant barrier to private sector investment in a CNG fuelling station project in Leeds, as it is deemed too risky in the absence of an established customer base. By developing a 'build it and they will come' proof of concept, NGN seeks to demonstrate the business case for private sector investment in large scale city-based CNG stations.

At a high level, we are satisfied that consideration of alternative connection charging arrangements and the commercial and regulatory barriers to putting these in place has significant potential value for other GDNs. Indeed, we welcome NGN's initiative of exploring a novel charging arrangement for connections. It is an area that network companies have done little innovative thinking around in the past and we consider that this could potentially be of industry-wide value – not just for gas.

However, we share the Panel's concerns that NGN has failed to clearly articulate precisely how it intends to investigate and overcome such barriers in its submission. Given how central this is to the innovation being proposed, we would have liked to see this highlighted more clearly as a predominant theme throughout NGN's submission.

In order to ensure that maximum benefits flow back to consumers, we have therefore decided to put in place two conditions which must be complied with before any NIC funding is released. The conditions are:

1) NGN revises its full submission to improve the clarity on the commercial and regulatory barriers that the project seeks to overcome, and on the learning objectives and deliverables specifically related to the novel charging arrangement;

2) NGN revises the figures in its full submission (including the project budget spreadsheet), setting out how any NIC funding will be spent in light of our decision to partially fund the project.

We would like to highlight the value placed on the quality of network companies' submissions during the evaluation process. We feel it important that a submission should articulate very clearly:

- what the core innovation is being proposed
- precisely how this will be explored and potential barriers to be overcome
- what the proposed outcomes are
- how any resulting innovation may be rolled out more widely.

Our decision to partially fund is in line with advice from the Expert Panel. It also reflects the fact that in NGN's case, we feel that its submission could have been clearer on some of these key components. In order to ensure that the project can progress and deliver valuable learning to other network companies, we would be happy to work with NGN to clarify and strengthen its submission in line with the conditions above.

We expect NGN to have revised and resubmitted its submission to us in line with the two conditions above by early 2016. We will then consider the extent to which it meets these conditions, before NGN will be permitted to spend any NIC funding. If necessary, this may also include us changing the Project Direction for this project after it is issued in December 2015.

(d) Is innovative (ie not business as usual) and has an unproven business case where the innovation risk warrants a limited development or demonstration project to demonstrate its effectiveness

We are satisfied that the commercial arrangement being proposed is unproven and has not been used in the gas sector before. We also note that, whilst there are some smaller, purpose built stations connected to the medium pressure network, the station being proposed will be the first CNG station connected to the high pressure network.

(e) Involvement of other project partners and external funding

We and the Expert Panel are encouraged by the level of involvement of LCC and have been impressed by its commitment to address the city's air quality problems and reduce its carbon emissions.

We note that LCC is in a position to provide the anchor load of refuse collection vehicles for the station which, combined with NGN's commitment to convert its vehicles, will provide the necessary baseload to 'kick start' the project.

We note the Expert Panel's concern that the project has yet to attract a third party to build the filling station, though also acknowledge that securing such a party will be easier once funding for the connection has been agreed.

The project has no external funding.

(f) Relevance and timing

We and the Panel are satisfied that the project is highly relevant and timely.

We note the urgent need to improve air quality, particularly in city centres, in order to address the public health impacts from PM_{10} and NOx pollution.

We also note that under the Climate Change Act 2008, the UK must reduce its greenhouse gas emissions by at least 80% by 2050 relative to a 1990 baseline. Transport has been identified as one of the sectors where the most significant challenges lie.

(g) Demonstration of a robust methodology and that the project is ready to implement

We agree with the Expert Panel's opinion that the project objectives of testing a new commercial methodology could be met at lower cost by building a smaller demonstration fuelling station. We also note that the Panel would have liked to see a firm commitment from a third party to build the filling station. Further, we are concerned that the learning objectives and deliverables from the novel charging arrangement have not been set out in adequate detail, and we have developed funding conditions to address this. As stated above, we were impressed by the level of commitment and engagement from LCC and we believe the project can be implemented, should NGN choose to go ahead with lower NIC funding than they originally requested.