Gas Network Innovation Competition: 2014 funding decision

Decision on the second year competition

Publication date: 24/11/2014

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Overview

We run an annual Gas Network Innovation Competition (NIC) to stimulate innovation in gas transmission and distribution networks. Through the Gas NIC, Network Licensees can apply in partnership with others for up to £18 million to fund innovative projects that could have the potential to deliver benefits to customers. This document explains which project we have selected for funding this year.

This was the second year of the Gas NIC and two Network Licensees applied for funding. We have selected one project for funding. This decision is consistent with the recommendations of our independent expert panel. We propose to award £5.67 million of the available £18 million to this project. The Network Licensee and a range of partners will invest £0.63 million of funding and in-kind contributions in the project.

The successful project will design and develop a robotic device to inspect complex underground gas pipework. It was selected because it will help Network Licensees reduce the overall carbon footprint and wider environmental impact of the gas transportation business, as well as having the potential to deliver financial benefits to customers.

Context

The gas network companies will face a number of challenges over the coming years. These include -

- Playing a role in delivering the low carbon economy and the objectives of the Carbon Plan.
- Reducing the overall carbon footprint of the gas transportation businesses.
- Enabling alternative and/or renewable sources of gas to connect to the network.
- Adapting the networks to cope with the impact of climate change.

These challenges will affect the gas distribution and transmission networks and the way the Network Licensees plan and manage their businesses.[1] Network Licensees will need to innovate in the way they design, plan and operate their networks.

The Gas NIC is designed to help stimulate this innovation. It provides up to £18 million of funding each year to encourage Network Licensees to undertake trials to address these challenges in the most cost-effective way. Network Licensees will gain understanding from these trials, which they will then be able to apply to the specific challenges they face. This could potentially bring benefits and cost savings to consumers in the future.

Associated documents

Gas NIC Governance Document

RIIO-T1 Strategy Decision

RIIO-GD1 Strategy Decision

Decision on funding the cost of preparing submissions for the Network Innovation Competition and the Governance of the Network Innovation Allowance

Decisions on the Network Innovation Competition and timing and next steps for implementing the Innovation Stimulus

Decision and further consultation on the design of the Network Innovation Competition

[1] A Network Licensee is a holder of a Gas Transportation License, ie a Gas Distribution Network (GDN) owner or the Gas National Transmission System Operator.

Contents

Executive summary

The Gas NIC is an annual competition which helps to encourage Network Licensees to innovate in the design, development and operation of their networks.

It 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. Trials financed through the Gas NIC will generate learning for all licensees. This learning brings potential environmental benefits and cost savings for current and future consumers.

We ran the competition for the second time this year. This document contains our decision.[2]

The two submissions we received requested a total of £11.3 million of funding. From these, we have selected one project for funding. We will approve funding of £5.67 million, of the available £18 million. The project proposals were assessed against published criteria in the Gas NIC Governance Document which we have summarised in Appendix 1.[3]

Successful projects

In reaching the decision to fund one project, we were advised by our independent expert panel, which reviewed the project submissions and recommended which projects should be provided with funding.

After consideration, we have accepted the expert panel's recommendations. We plan to place an additional requirement on this project, in order to ensure it delivers good value for customers.

In Line Robotic Inspection of High Pressure Installations (National Grid Gas Transmission)

In Line Robotic Inspection of High Pressure Installations, submitted by National Grid Gas Transmission, in partnership with Synthotech and Premtech, has requested £5.67 million. The project aims to design and develop a robotic device to conduct in line inspection of complex underground pipework in Above Ground Installations at high pressure and potentially high flow rates. This would reduce the number of unnecessary excavations and help to extend asset life.

[2] The terms "the Authority", "Ofgem", "we", "us" and "our" are used interchangeably in this document. The Authority is the Gas and Electricity Markets Authority. Ofgem is the Office of the Authority.

[3] Our Governance Document and criteria have been formulated against our principal objective and general statutory duties.

Unsuccessful project

We received an application from one project which we do not intend to fund.

T-Shale (Northern Gas Networks)

This project aimed to deliver a new framework for identifying and assessing efficient pipeline investment to maximise the net benefit associated with shale gas production. This would have been in partnership with Addleshaw Goddard, Aqua Consultants, Environmental Resources Management (ERM), Enzen Global Ltd, Leeds University, National Grid and United Kingdom Onshore Oil and Gas (UKOOG). Although interesting and relevant, the proposal did not provide sufficient evidence that the project addresses all the evaluation criteria.

We were not convinced the project would accelerate the development of a low carbon energy sector or deliver other environmental benefits. The submission did not quantify a net financial benefit to customers and lacked evidence that the project is good value. We were disappointed by the low level of stakeholder engagement and the lack of overall coherence in the submission.

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 competitions.

Purpose

1.1. We assessed the projects against the evaluation criteria in the Gas Network Innovation Competition Governance Document.[4] The criteria are summarised in Appendix 1.

1.2. We have published a number of other documents alongside this decision. These are -

- The full submissions and the resubmissions for the projects. These provide the information we used to evaluate them.
- The independent expert panel's recommendations on which projects should receive funding.
- Reports by our consultant, Frazer Nash, on each project (based on the original project submission). These include a set of challenges posed to the companies by the consultant, the company responses to the challenges and the consultant's conclusions. The reports aided the expert panel's assessment.
- The Network Licensee's answers to questions that we, Frazer Nash and the expert panel raised on each project.

1.3. 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.

The Gas Network Innovation Competition

1.4. Network Licensees need to consider how they can play a full role in tackling climate change while maintaining security of supply and providing value for money to customers. Significant investment in Great Britain's gas and electricity network infrastructure is needed to ensure security of supply.

1.5. The Gas NIC helps to encourage Network Licensees to work in partnerships with third parties to innovate in the way they design, develop and operate their networks. It is an annual competition which can provide 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.

1.6. The Gas NIC is open for applications from gas distribution network operators (GDNs) and the gas transmission licensee, National Grid Gas Transmission plc.

1.7. Customers of the gas network fund the Gas NIC projects. Therefore, a key feature of the NIC is the requirement that learning gained through projects is disseminated. This is to ensure that customers gain a significant return on their funding through the broad rollout of the successful projects. This return includes the delivery of financial benefits and carbon and/or environmental benefits. Even where the funded projects are deemed unsuccessful at the end of the project life, Network Licensees will gain valuable knowledge that could result in future savings.

Structure of the Network Innovation Competition

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

1.9. The annual competition starts with Network Licensees submitting to us outline project proposals in the Initial Screening Process (ISP). During the ISP, we consider whether these proposals are eligible for funding. Only eligible projects are allowed to progress to the full submission stage.

1.10. 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 individuals with specific knowledge and expertise in energy networks, environmental policy, technical and engineering issues, economics and finance, and consumer issues. The expert panel assesses each project against the evaluation criteria.

[5] The biographies of the expert panel can be found here.

The 2014 competition

1.11. This year's competition began with the ISP in April 2014. We received three submissions and were satisfied that two of them met the ISP eligibility requirements. Network Licensees submitted full submissions for two projects by the deadline of 25 July 2014. A brief summary of each project is in chapter 2 of this document and all the ISPs and full submissions are available on our website.[6]

1.12. This year, the combined funding requested was £11.3m (excluding bid preparation costs). The fund was undersubscribed.

1.13. The expert panel conducted a thorough evaluation of the submissions. It reviewed the Network Licensees' submissions and the reports from our consultant, Frazer Nash. It also met the Network Licensee's and their project partners twice. It then evaluated the projects against the criteria in the LCN Fund Governance Document. Where aspects of the Network Licensee's submissions required clarification, the Network Licensees had the opportunity to make the necessary changes and resubmit their proposals. The panel made its recommendations based on the final submissions. It submitted its recommendations report to us in early November 2014.

1.14. Frazer Nash scrutinised the original project submissions, validating the information supplied and challenging the risks and potential shortfalls of the projects in its reports. The Network Licensees were sent a draft of the consultant's report and responded to the challenges that were made in writing. Frazer Nash then updated its reports to include the Network Licensee's responses and provided its final analysis.[7] 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 along with Frazer Nash's reports.[8]

1.15. 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 included in Appendix 1 of this document.

[6] Full submissions can be found here.
[7] This was based on the first submission; the consultant was not required to review the resubmission.
[8] You can find all the documents here. This includes the expert panel's report, the full submissions, the consultant's reports and the questions and answers.

2. Decision

Chapter Summary

We have decided to fund one project out of the two submissions received. We will place additional conditions on this project. The project is being awarded £5.67 million in funding. This chapter provides the reasons for our decision.

Overview of full submissions

2.1. We were pleased by National Grid Gas Transmission's (NGGT's) partnerships with two small to medium-sized enterprises (SMEs). We, and the panel, recognised the potential benefit of Northern Gas Networks' (NGN's) project, but were disappointed by the quality of its submission. We strongly recommend that this project takes into account the feedback offered and considers how some components of the project may be taken forward in a more cost effective manner.

2.2. We, and the expert panel, are concerned that there were only two submissions for this year's competition. We encourage companies to use the feedback from this year's process in developing future project bids.

2.3. Table 2.1 provides a summary of the two full submissions.

Table 2.1: Summary of project submissions

Project	Funding request
In Line Robotic Inspection of High Pressure Installations This project aims to design and develop a robotic device to conduct in line inspection of complex pipework in Above Ground Installations at high pressure and potentially high flow rates. This would reduce the number of unnecessary excavations and help to extend asset life. *Submitted by National Grid Gas Transmission (in partnership with Synthotech and Premtech)*	£5.67m
T-Shale This project would deliver a new framework for identifying, assessing and implementing efficient infrastructure that maximises the net benefit associated with the development of shale gas production. *Submitted by Northern Gas Networks (in partnership with Addleshaw Goddard, Aqua Consultants, ERM, Enzen Global Ltd, Leeds University, National Grid and UKOOG)*	£5.62m

Our decision

2.4. We have considered the project submissions, the expert panel's recommendations and the consultant's reports against the competition's framework and our statutory and other duties. We have:

- selected one project for funding with additional conditions: In Line Robotic Inspection of High Pressure Installations (NGGT), £5.67 million; and
- decided that one project will not be selected for funding: T-Shale (NGN), £5.62 million.

Reasons for our decision

2.5. We reviewed each submission against each of the evaluation criteria. The assessments are in Appendix 1 of this decision. Below we summarise the reasons for our decision.

2.6. The total funding requested this year is below the £18 million annual funding limit. It would have been possible for us to fund both projects because of the amounts requested by each project. However, we only fund projects that perform well against the evaluation criteria.

Project selected for funding with additional conditions

In Line Robotic Inspection of High Pressure Installations (NGGT)

Overview

2.7. NGGT proposes to design and develop a robotic device to conduct in line inspection of the complex underground pipework at above ground installations. If successful, this would allow NGGT to use condition-based monitoring of more of its assets as opposed to predictive modelling or excavation.

2.8. The new device would potentially allow NGGT to develop an intelligent and proactive asset management strategy. This could reduce the number of unnecessary excavations, extend the life of the assets and reduce the likelihood of asset failure.

Summary of assessment

2.9. The three principal benefits of the project are estimated to bring financial benefits and modest but quantifiable carbon and environmental benefits:

- reducing the number of unnecessary excavations, saving 1,036 tonnes CO_2e per year and £1.9m per annum;

- reducing the premature replacement of assets, saving 1,109 tonnes CO_2e per year and £20m over 16 years; and

- reducing the likelihood of asset failure, saving £10m over 20 years.

2.10. We are satisfied that the project provides value for money to gas customers through a lower cost business plan for the next price control or the sharing factor of the current price control, which passes savings to consumers. The project costs are well justified and sufficient efforts made to ensure they are reduced.

2.11. The concept of the project is innovative and the submission contains adequate dissemination of the knowledge gained from the project which should benefit the gas distribution networks.

2.12. We are pleased by the partnerships between NGGT and two SMEs. NGGT demonstrated a good process of incorporating innovation into its business by identifying problems in need of solving and welcoming solutions to do this. The project incorporates a third party assurance to reduce the high technical risk associated with the project.

2.13. NGGT provided good justification for the timing of the project: the pipeline assets reaching the end of their asset life coinciding with the maturing of robotic technology.

2.14. The panel has recommended that this project be funded with additional conditions to ensure customers' money is spent efficiently.

2.15. We agree with the panel. To avoid the risk of funding being spent prematurely, NGGT must satisfy itself that the successful delivery reward criteria (SDRC) for each stage have been met before using funding for each subsequent stage. [9] In mitigating this risk, we expect appropriate internal senior sign-off to confirm each SDRC has been completed successfully. NGGT should publish this internal confirmation no later than when submitting the six-monthly report that follows the completion of that stage.

2.16. We consider this condition is appropriate because of the staged nature of this highly technical project, and the relatively high costs of the early stages. In its project plan, NGGT has provided a helpful framework for monitoring project development. This condition builds on that framework to mitigate the risk that funds are spent before each stage has established that the next stage is viable and that the project continues to have the potential to deliver a net benefit. The risk of

[9] This term is given meaning in the Gas NIC Governance Document.

inappropriate continuation of the project will be NGGT's to manage – we consider this creates the correct incentive for robust project management.

2.17. The project performed well across all of the evaluation criteria, and we therefore plan to fund this project with the additional conditions.

Project not selected for funding

T-Shale (NGN)

Overview

2.18. The remaining project, while interesting and relevant, did not perform strongly enough against a number of the evaluation criteria. We have therefore decided not to fund it. We did not think extra conditions would be sufficient for this project to overcome its weaknesses.

2.19. The project intended to deliver a new framework for identifying, assessing and implementing infrastructure required to maximise the benefit from the development of shale gas.

2.20. The project would have:

- delivered scenarios of investment options;
- developed a model for assessing the costs and benefits of each scenario against carbon, environmental, socio-economic and legal impacts; and
- identified the regulatory and commercial framework which would have been required to deliver the investment options.

Summary of assessment

2.21. There was insufficient evidence that the project would have directly provided carbon, other environmental or financial benefits. The project would have developed impact assessments of the investment scenarios. However the submission did not provide any quantification of the potential impacts. We were concerned that NGN did not make a case for the project having tangible benefits.

2.22. Although NGN reduced some of the project costs, in response to panel feedback, the submission did not justify the overall high cost of the project. We remained concerned about the wide scope of the project and NGN's reluctance to use alternative data (including from smart meters) to further reduce costs of some components.

2.23. The submission did not include strong evidence of early engagement with key stakeholders. This engagement might have assisted NGN in better defining the project's scope.

2.24. We consider that the submission would benefit from prior work to produce a better-defined project scope and methodology.

2.25. We were concerned about the overall coherence of the project and we had serious concerns about the performance of this project against a number of the evaluation criteria. We will therefore not fund this project.

2.26. While the project was not sufficiently well developed to be funded this year, we consider that the underlying opportunity that the project was seeking to exploit is a real and significant one. NGN could develop the project methodology and the costs and benefits case for this project further and bring it forward to a future NIC competition.

Customer issues in running the project

2.27. We do not expect the project selected for funding to have any significant direct customer impacts during trialling. No direct customer interaction was identified in the submission.

3. Next steps

Chapter Summary

NGGT will receive its project direction in December 2014 and funding from 1 April 2015. We will publish the dates for next year's competition in early 2015.

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 the funding.[10] We are currently preparing the project direction for the successful submission and we will issue a draft version of this to the funding licensee shortly. The project direction for In Line Robotic Inspection of High Pressure Installations will include the additional conditions outlined in chapter 2 of this document.

3.2. Once the funding licensee accepts the 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 course of the next regulatory year to fund the successful NIC project.[11] 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 2014.

3.3. Although funding will not be raised until the next regulatory year (starting on 1 April 2015) we expect the funding licensee to start its project as quickly as possible, according to the terms of the project direction and the Gas NIC Governance Document.

3.4. We will monitor the project to ensure it is implemented in line with the full submission. The 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. The funding licensee should also share its project's learning according to the plan set out in the project submission. In addition, funding licensees (including those from last year) must hold an annual conference, open to all, where they present the learning from their projects. Finally, the Energy Networks Association has developed a portal which holds learning from innovation projects, including from the LCN Fund and the Gas and Electricity NICs. We expect learning all year's projects to be made available through the portal.[12]

3.5. There's an extra incentive for funding licensees to deliver the projects to a high standard. They will be eligible to apply for a delivery reward if they meet the delivery criteria set out in the project direction. The Successful Delivery Reward is

[10] These terms are defined in the Gas NIC Governance Document.
[11] Requirements for the Funding Direction can be found in paragraph 7.1 of the Gas NIC Governance Document.
[12] Please see the smarter networks portal here: http://www.ena-eng.org/smarter-networks/index.aspx.

designed to reward those projects which are well managed and completed at least to the standard that could be expected from the full submission.

Future competitions

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

3.7. The expert panel also provided its views in section 4.4 of its 2014 recommendations report. We ask bidders in future competitions to take these points into account when developing their submissions.

3.8. We have noted the concerns raised by the GDNs which have resulted in a disappointing number of projects being submitted this year. We may propose changes to the Gas NIC Governance Document to incorporate lessons learnt from this year's process and to make a number of housekeeping changes. The Gas NIC Governance Document (v2) would then govern the third year of the Gas NIC. If we decided to make any changes following consultation, these would be in place prior to the ISP deadline in 2015.

3.9. We will look at the Governance Document and may apply any relevant lessons learnt from our review of the Low Carbon Networks Fund in 2016.

3.10. We will confirm the ISP and full submission deadlines in early 2015. We expect them to be similar to the deadlines in 2014.

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's 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.

In Line Robotic Inspection of High Pressure Installations (NGGT)

Project overview

National Grid Gas Transmission (NGGT), partnered with two Small to Medium Enterprises (SMEs), to design and develop a robotic device to conduct in line inspection of the complex underground pipework of Above Ground Installations (AGIs) at high pressure and potentially high flow rates. If successful, the project would allow NGGT to switch from predictive asset type modelling to a condition-based monitoring of these critical assets.

The below ground pipework at AGIs on NGGT's network is nearing the end of its original anticipated asset life. This complex pipework contains tight bends and changing pipe diameters, preventing standard pipeline inspection gauges (PIGs) from inspecting them internally. Current methods for external inspection, which assess asset condition as they age, may increasingly require excavation, which has associated financial and environmental costs. Without a full understanding of asset condition there is a risk of asset failure at the AGIs.

The new device would allow NGGT to develop an intelligent and proactive asset management strategy for these assets. This could reduce the number of unnecessary inspection excavations, extend the lifetime of the assets and reduce the likelihood of asset failure at AGIs. The device could also be utilised on the unpiggable pipelines owned by the GDNs.

(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 robotic device could deliver modest but quantifiable carbon and environmental benefits by reducing the number of unnecessary excavations and by extending the design life of the assets. These benefits would also result in significant cost savings. We were less persuaded by the benefits of reduced risk of asset failure as we considered that the current asset management process should militate against this risk.

Low carbon and/or environmental benefits

NGGT has estimated the carbon reduction associated with each of the three main benefits of the project. NGGT has calculated these reductions based on extending the technique to all of its applicable pipework. The reductions would increase if GDNs also utilise the device on a national scale. The estimated carbon reductions are:

- reduced unnecessary excavations on NGGT's network ~ 1,036 tonnes CO_2e per year

- extending the asset life of the components at a typical high pressure site ~ 6 tonnes CO_2e per year, equating to ~ 1,109 tonnes CO_2e per year on a national scale

- preventing the failure of an asset ~ 6,800 tonnes CO_2e per high pressure failure.

During our assessment, we raised concerns over the negative carbon impacts through venting while the device is entering and exiting the pipeline. However, NGGT argued that the carbon benefits associated with the project far outweigh this potential potential impact.

Net financial benefits

Gas customers could benefit from this project through a lower cost business plan for RIIO-T2 and potentially via the TOTEX incentive mechanism in RIIO-T1, which passes savings on to consumers. The savings would be derived once the robotic device has been deployed for asset condition assessments, which could allow better planning and reduced costs. The assets' life span could be extended, allowing planned replacement and reducing the cost of unnecessary replacements. Customers would also benefit from a reduced number of costly unnecessary excavations. NGGT argued that this would also reduce the risk of asset failure or supply disruption.

The project could reduce the costs of maintaining and replacing the below ground pipework at AGIs. As the assets are reaching the end of their design life, NGGT consider that the number of excavations would need to increase to approximately 15 per year, of which half could be found to have been unnecessary. By minimising the occurrence of unnecessary excavations and premature replacement of assets this project could lead to cost savings of circa £58 million over 20 years. NGGT has assumed that the savings of an avoided asset failure incident, as a result of increased understanding of the pipework condition, could be £10 million.

As with the carbon and environmental benefits, the financial savings would be applicable to GDNs as well, but this has not been quantified.

(b) Provides value for money to gas customers

We are satisfied that this project provides value for money to gas customers.

NGGT has justified the costs of the project in detail and appears to have gone to lengths to ensure costs are necessary and minimised where possible. We are pleased by the way that NGGT has incorporated a process of encouraging innovation and SMEs into its business.

Given the high technical risk of the project we welcome the staged project plan proposed by NGGT, which has incremental development and testing dependent on successful completion of earlier stages. We have decided to secure additional protection to customers by requiring NGGT to get internal senior sign-off confirming that the SDRC for each stage have been met before using funding for each subsequent stage. This is to minimise the risk that further customers' money is spent

on the project before each prior stage has been successfully completed. In particular, this will ensure that each of the highly technical and high cost early stages only commences once its viability has been established, and there is evidence that the project continues to have the potential to deliver a net benefit.

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

The project is novel and would produce new technology and a considerable amount of associated knowledge. The knowledge would range from the technical design of the device to the amalgamated information gathered on international PIG devices. The project should also generate condition knowledge to inform the development of algorithms, which could lead to new predictions for assets' conditions across other similar networks. We would expect NGGT to publish lessons learnt from the project should it fail to fulfil its goals or fail to be completed.

GDNs would also benefit from this project. The project has involved early engagement with the GDNs and is supported by letters from some of the GDNs. We were pleased with the engagement with SGN on its robotics project to which we awarded funding under last year's Gas NIC.

We are pleased by the open intellectual property rights (IPR) arrangements which would allow the device to be replicated elsewhere on the gas network. The learning and knowledge from the project would be shared openly with the other network licensees. Following feedback, NGGT revised the IPR arrangements to make them more straight forward, where all foreground intellectual property would be owned by NGGT and licensed to project partners and other interested parties. The robotic device would be made commercially available to other network licensees on the same terms on which it is made available to NGGT.

The project involves an acceptable amount of knowledge dissemination. NGGT would use events, publications, GDN meetings and web-based techniques.

(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

NGGT has assured us that the design and development of the robotic device is unique and carries a high technical risk. The submission outlines the thorough patent search and technology watch undertaken by NGGT. We are satisfied that this project is innovative.

Although there are PIG devices used across the oil and gas industries there are none which are used through complex pipework. We welcome the action of Synthotech to continue a 'Tech Watch' through the device design process to identify similar or replicable devices. This provides confidence that the project is innovative, or if a similar device is found during the design process, this will be replicated where possible to save money.

We are satisfied that this project can proceed with NIC funding owing to the high risk and cost associated with design, development and testing.

(e) Involvement of other project partners and External Funding

We are satisfied with the choice of the two main project partners, Synthotech and Premtech (both SMEs), and welcome the use of Pipeline Integrity Engineers Ltd (PIE) for third party assurance. We are confident that NGGT would be able to manage the project appropriately and that the contracts which are in place with the SMEs are robust with a clear progression path.

NGGT has demonstrated a proactive and robust process for incorporating innovation into its business and a willingness to partner with SMEs, which we welcome.

Synthotech would design and develop 3D computer models to be printed and fitted with functional electronics and pneumatics/hydraulics. Synthotech would then test the models and develop the next stages. Premtech would design and develop the insertion and extraction device. PIE would independently validate the data produced during testing procedures.

The project would also use PIE to provide third party assurance and support in the technical delivering and implementation. The project would also use other collaborators such as Leeds University, which has offered facilities and students as support for Synthotech.

The project has no external funding.

(f) Relevance and timing

We consider the justification for the relevance and timing of this project is sufficient.

NGGT argues that robotic technology has recently matured to a point of consideration for use within its AGI network. This, alongside the pipeline assets reaching the end of their asset lifetime, provides an acceptable justification for the timing of the project.

As the end of the original design life of the assets comes closer, the need for better inspection and better justification for replacement increases. Ordinarily this would require an increased number of excavations, some of which could prove to be unnecessary. The robotic device would undertake more efficient and cost effective asset inspection. This will contribute to carbon reduction.

If successful, the robotic device would have a direct impact on NGGT's business plan for RIIO-T2 (and subsequent price controls) and potentially through the TOTEX incentive mechanism throughout RIIO-T1. The technique would allow the business plan to be informed by robust data on asset condition.

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

The project includes a robust methodology and we are confident that the project is ready to implement.

The project will have no direct impact on customers.

The project has a detailed project plan which has been well thought out and is suitable for work to commence. NGGT has reasonably estimated the project costs. We welcome the use of the SDRC, to identify acceptance criteria for incremental development and testing. We also welcome the externally-reviewed risk assessment which provides confidence that the risks are recognised, and appropriate risk mitigation steps are in place.

We are pleased with the project management steps put in place to ensure the project partners are properly managed and the project as a whole remains on track.

We were concerned that the submission has a limited definition and assessment of the safety implications of the project, NGGT has provided assurances that safety procedures will follow its stringent corporate standards which we were satisfied with.

T-Shale (NGN)

Project overview

NGN's proposal is based on the expectation of the increasing likelihood of the uptake of shale gas across the UK. However, there has been little infrastructure consideration or development, which would be required to exploit the benefits of shale gas. The shale gas would be injected as an unconventional gas into the current gas transportation system. Currently, GDNs understanding of low flow conditions in their networks is too limited to allow them to assess whether existing infrastructure is capable of accepting gas injection from producers during periods of low demand.

NGN argue that, without proper analysis, the UK's shale gas industry may develop on a local basis with no national consideration for the most efficient, environmentally aware and socially responsible transportation infrastructure. This could result, on a national scale, in sub-optimal network development and utilisation.

NGN submitted T-Shale which would deliver a new framework to identify, assess and implement infrastructure, to maximise the net benefit associated with the development of shale gas production. It would have done so by: developing scenarios to simulate investment options; developing a system to allow modelling of the cost-benefit profiles for scenarios against wide investment criteria; and identifying a regulatory and commercial framework required to deliver investment options.

T-Shale would have provided policy makers, regulators, gas transporters and shale gas producers, with the necessary information and data to assess the costs and benefits of infrastructure options.

(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 would not have directly provided carbon, environmental or financial benefits. It would have provided carbon and environmental impact assessments and a costing tool of different transportation options to policy makers, gas transporters and shale gas producers. These stakeholders could have then analysed different shale transportation options. Therefore, the project does not directly accelerate the development of a low carbon energy sector. We were concerned that the case put forward under this criterion was poorly justified with only indirect benefits.

Low carbon and/or environmental benefits

Project partners would have produced carbon and environmental impact assessments of shale transportation options and would have included these within a number of scenarios. The project itself would not have directly provided a carbon or environmental benefit. NGN argues that the resulting information would provide guidance and the opportunity to quantify impacts, resulting in an understanding of the shale transportation options and identifying the lowest carbon and environmental impacts. However, the submission does not provide a quantification of these.

We and the panel felt that the justification for the environmental benefits was not sufficient. The submission was unclear about who would use and act on choosing options based on carbon and/or environmental benefits.

Net financial benefits

The submission does not claim to provide direct financial benefits to customers. NGN argues that a full understanding of transportation development options for shale gas could prevent a sub-optimised transportation system. The submission claims that the project would have provided the opportunity to quantify the commercial benefits of different transportation options, thus allowing the UK to fully-benefit from the emergence of shale gas as a primary gas source.

We were concerned that the case for direct benefits from the project was not provided. NGN argued that the financial benefits could only be produced once the project was underway and the scope of the project developed. However, in light of the high cost of the project and lack of engagement with potential shale gas developers, we considered that more financial justification was required if funding were to be provided.

We support the panel's assertions that this project would benefit from developing the benefits case further prior to applying for NIC funding.

(b) Provides value for money to gas customers

Part of the project, the analysis of network capacity on the distribution network in low flow conditions, would have resulted in a quantification of network constraints. This analysis could potentially lead to a better understanding of the network itself as well as the impact of unconventional sources of gas on the network. We believe that this could benefit distribution customers as GDNs would potentially better understand their networks and therefore potentially utilise the network more efficiently.

The project would potentially have provided a fuller picture of the considerations of shale development and its impact on gas networks. This could have had a possible financial benefit to shale gas producers and other stakeholders seeking the most cost efficient access option to the gas network. However, we share the panel's concerns that the scope of this project was too large. A number of elements of the project, such as the socio-economic analysis, appear extraneous to NGN's core functions with no direct benefits for gas customers. We are concerned that, despite a high funding request, there are elements of the project which are uncertain, such as the number of scenarios to be produced, and a thorough cost-benefit analysis has not been undertaken.

Our lack of confidence in the scope and overall value of the project made it difficult for us to justify the high funding request. We welcomed the efforts of NGN to reduce its costs, such as a commitment to re-tender for certain aspects and using smart metering data to validate flow rates. We were disappointed that NGN had not included use of smart metering and other available data in its original proposal given the significant costs incurred by gas customers in the smart meter roll out. We

consider that costs could have been further reduced by making use of existing data sources (including smart meter data) to reduce the relatively high cost of the flow monitoring equipment.

Overall, the response to challenges from NGN was insufficient to make a robust value for money case. We considered that the value for money case would have benefited from more preliminary work to develop the project, providing greater certainty and a better defined scope.

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

The project would have generated technical, operational and commercial knowledge. The project team would have captured this knowledge and disseminated it through the project website, publications and events such as workshops, conferences and video updates.

GDNs would benefit from a better understanding of the low flow rate conditions on their network. T-Shale could potentially have identified the low flow rates of NGN's network and provided data for other networks. GDNs could have adopted the learning to accurately model low flow capacities on their own networks and identified the scope for injection of unconventional sources of gas during low demand conditions. The transportation scenarios could have been developed in collaboration with all GDNs to ensure they are relevant across the country.

The project would conform to the NIC default IPR arrangements with a memorandum of understanding among project partners.

(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

NGN considers this to be an innovative project. We accept that the problem being addressed has not been tackled in the UK previously. Given this, the development of the model would not be business as usual and would be innovative.

(e) Involvement of other project partners and External Funding

T-Shale would have had no external funding.

NGN would have employed a number of project partners to undertake work which NGN is not able to source in house. NGN secured discounted rates for a number of the project partners which were chosen on the basis of particular sector knowledge or expertise. NGN committed to re-tender the role of one of the proposed project partners, owing to the panel and our concerns with its particularly high day rates.

We were disappointed with the lack of early engagement with some potential project stakeholders such as shale gas producers or energy suppliers with respect to smart metering data. Within the RIIO-G1 framework we expect GDNs to engage early and appropriately with stakeholders. From this early engagement producers could have

helped better define the scope of the project, for instance by providing information on the physical and commercial aspects of shale gas development.

(f) Relevance and timing

With the emergence of shale gas and other unconventional gas becoming credible sources for future GB energy requirements this project would be relevant. This project would have sought to tackle one of the potential barriers facing the shale gas industry. It would have been beneficial to stakeholders in identifying potential network constraints, and to the GDNs for future business planning.

The submission does not justify the timing of the project. Without quantified carbon benefits we cannot be confident that the project would have facilitated the move to a low carbon energy sector. We, and the panel, felt that prior work would benefit the project and allow a better-defined project with a better developed business case and scope. For example, NGN has not made the case that waiting for smart metering data to become available, replacing the need for the installation of expensive flow monitoring equipment, would critically damage the timeliness of the project. Early engagement could have provided more justification for the project's timelines by establishing the relationship between the likely shale gas production, timelines and the potential benefits from this project. In the absence of such information from (potential) shale gas producers, NGN was unable to make a convincing case that this project would be timely.

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

The project has a largely robust project management; the submission contains a project plan and a risk log. There is a project team in place supported by project partners. The project has milestones which are in line with the project plan.

The project would have had no impact on customers.

We have concerns regarding the overall coherence of the project. The environmental, socio-economic and regulatory impact assessments seem somewhat independent of other parts of the project, and were not directly relevant for a project seeking NIC funding.

The project did not request any protection against cost over-runs and had steps in place to minimise the risk of potential cost overruns.

One key potential benefit of the project would be a better understanding of low flow conditions. However, we were concerned with the high cost of this element of the project, owing to the high number of flow meters that were to be installed. While NGN has responded to our feedback by seeking to use smart metering data to validate the low flow model, we agree with the panel that NGN could have done more to examine the scope to use existing data for low flow modelling.

We consider that prior work, either through the NIA or otherwise, in developing this project could have reduced the elements of uncertainty and produced a submission with a better developed scope.