

# **Gas Network Innovation Competition 2017 Report and Recommendations**

**Prepared for  
The Gas & Electricity Markets Authority**

**By**

**Gas Network Innovation Competition Expert Panel**

**October 2017**

## **1 Introduction**

**1.1** This report is prepared by the Gas Network Innovation Competition (NIC) Expert Panel (the Panel) and sets out the Panel's recommendations to the Gas and Electricity Markets Authority on the portfolio of projects to be funded in the 2017 funding round. The members of the Panel are as follows:

- **Ron Chapman**
- **Miriam Greenwood OBE DL (Chair)**
- **Trisha McAuley**
- **Prof. David Newbery**
- **Sean Sutcliffe**

**1.2** We received three submissions. Full details of each submission will be available on the Ofgem website. The names of the companies, titles of the submissions and the amount requested from the Gas NIC are as follows (the values in brackets show the total cost of each of the projects).

- **Tain Innovative Gas Grid - Fulcrum Pipelines Limited - £2,139k requested (£3,728k in total)**

- **Robotic Roadworks and Excavation System - Southern Gas Networks and Scotland Gas Networks - £6,326k requested (£7,304k in total)**

- **H21 - Northern Gas Networks - £13,310k requested (£15,172k in total)**

**1.3** The Panel followed the evaluation process set out in the Gas NIC Governance Document version 3.0 (30<sup>th</sup> June 2017). Initial submissions were received by Ofgem and were screened for compliance with the requirements set out for the Initial Screening Process. Consultants were appointed by Ofgem to review the submissions. The Panel and the Consultants met the Network Licensees (NLs) early in the evaluation process to allow the project teams to present their

submissions. Prior to the second bilateral meeting the Panel sent each of the NLs a number of questions to clarify the submissions and highlight areas for further explanation and/or concern. The Panel also met with BEIS to receive an update on their 'Clean Growth Strategy' and the proposed funding of hydrogen-ready appliances for use in buildings.

Following those meetings, the Panel met to review each of the submissions in the context of the criteria set out in the Governance Document. In evaluating the submissions, the Panel carefully considered all the documents which had been provided which included: the submissions, their appendices, the consultants' comments and all additional information which was submitted to Ofgem by the NLs. They also took account of information from meetings which were held with the NLs and materials provided during those meetings. The Panel, as it is obliged to do, reviewed the projects against the NIC governance criteria.

- 1.4** This report, which should be read together with the NLs' submissions and the other information published concurrently on the Ofgem website, sets out the results of the Panel's deliberations and its recommendations to the Authority. As such it reflects the considered views of the Panel.

## **2 Evaluation Criteria**

- 2.1** The Gas NIC Governance Document sets out the criteria which the Panel is required to take into account in the evaluation process.

In this section, we set out those evaluation criteria and discuss a number of points which arose during the evaluation process and which provide context for the evaluation of the projects described further in this document. A full description of the criteria is set out in the Governance Document itself.

**2.2 (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.**

It is important that projects either value the direct costs and benefits of the work being funded or include clear estimates of the costs of any further work that would be required before the benefits can be realised. The Panel found bids where the benefit projections were based on realistic evidence and expectations about the speed and extent of implementation to be more convincing than exaggerated claims based on assumptions rather than evidence.

In calculating the expected financial and/or environmental benefits, it is important to demonstrate that they can be easily explained to (and supported by) gas customers who are being asked to fund the project. This was not always clearly set out and the Panel had to request clarifications and further information.

**2.3 (b) Provides value for money to gas customers.**

The Panel recognises that there are often no alternative providers of some of the specialist services provided by the partners, although the reasons for this need to be made clear. However, the NLs should demonstrate that they have taken care to ensure that costs are in line with the market rates for such services.

**2.4 (c) Generates knowledge that can be shared amongst all relevant NLs.**

The Panel was encouraged to see that the projects were building on previous NIA and Gas NIC work. In particular, it was pleasing to hear that one bid had waited so that more background work could be completed using NIA funding.

There is a significant amount of underspend of the NIA allowances each year and whilst the Panel recognises that the NIA is an individual NL allowance, there is nothing that prevents collaboration amongst NLs to utilise the allowances. NL's should also carefully consider the Technology Readiness Level criteria required by the NIA and NIC respectively.

The Panel again saw evidence that the NLs were inviting ideas and participation from a wider range of partners. In particular, the NLs showed a much better grasp of developments in other countries, and it was encouraging that work in other countries on, for example, Carbon Capture and Storage (CCS) was referenced. However, the Panel certainly felt there was more scope in this area.

The Panel was pleased to see evidence that the NLs are increasingly collaborating on their bids.

**2.5 (d) Is innovative (i.e. 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.**

The Panel were pleased that all of the bids submitted met this criteria and that this aspect of the NIC is well understood by the NLs.

**2.6 (e) Involvement of other project partners and external funding.**

Collaboration between NLs and other parties in the international energy supply chain is a central objective of the Gas NIC. In order to enhance value for money for gas customers, the Panel expects the NLs both to explore and raise additional funding where this is available. The Panel was pleased to see that Project partners were making a contribution if they stood to gain commercially.

None of this year's bids included any significant external funding which would have strengthened the bids and provided better value for money for gas customers.

The Panel was pleased to see real evidence of strong partnerships developing to deliver innovation and would wish to see this continue. Partners' presence at bilateral meetings and bid presentations reassured the Panel that those bids were properly supported by the right kind of expertise and commitment.

## **2.7 (f) Relevance and timing.**

The Panel was pleased to see an operational involvement in all of the project definitions. This generates confidence that there is a real business need for the innovation and that the implementation will be timely.

The Panel would encourage the NLs to complete all of the background work with NIA funding before submitting a NIC bid. This would provide clearer project plans and stronger cases for funding. The requirement for additional stage gates has been used to address this in the past but this is not necessarily the best way forward.

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

The Panel was pleased to see an increase in the number of bids submitted. Once again, the Panel was impressed by the overall quality of the bids but it is important that project plans are thought through, well-prepared, clearly articulated and with the appropriate costings attached to each project phase. As there are no longer rewards for successful delivery, it is important that the project deliverables are defined in detail and will be considered by the Panel.

## **2.9 Comments on process**

The Panel met the NLs twice during the evaluation process. Prior to the second meeting, the Panel provided the bidders with a list of questions they wished to see answered at the second bilateral. The Panel was disappointed that not all of the bidders understood or sought to answer the Panel's questions. The Panel considers the submissions carefully and simply to reiterate the original arguments in response to questions is neither helpful nor persuasive. In those cases where the bidders engaged more effectively with the questions they were often able to allay concerns.

## **3 Evaluation of submissions**

### **3.1 Tain Innovative Gas Grid - Fulcrum Pipelines Limited - £2,139k requested (£3,728k in total)**

The Panel was pleased to see a new bidder (an IGT) seeking funding from the NIC.

This project seeks to deliver Compressed Natural Gas (CNG) and biomethane via a new standalone network to the community of Tain in the North of Scotland. The project will benefit from a separate scheme to supply the nearby Glenmorangie Distillery, thereby allowing Tain customers access to the upstream infrastructure at marginal cost.

The challenge for more remote communities like Tain is how to obtain a secure gas supply when they are too far from the integrated gas network for a conventional, physical connection to be economic.

The Panel supported the key aspiration of the project i.e. to help alleviate fuel poverty in the overall context of the specific challenges that exist in the Scottish

Highlands including electricity-only off-gas grid customers, reliant on an unregulated supply of high carbon heat, and a hard-to-treat housing stock.

The solution being proposed is to utilise a twin-stream pressure reduction station to take gas from 250 barg as CNG to domestic pressures. A range of approaches for managing peak demand will be tested to ensure security of supply. The trial will demonstrate a domestic regulator, with a self-resetting low-pressure cut-off mechanism, which will facilitate customer self-restoration in the unlikely event of a loss of supply. Hybrid heating systems will be installed to assess their performance. The trial will require the development of new regulatory and technical standards.

The trial will demonstrate how to develop a standalone gas network supplied by CNG, without the need for ongoing subsidies, with the potential for roll-out to other towns in Scotland and possibly more widely in the UK, in particular where there is a strong base load (such as a distillery) to anchor a project.

### **Low carbon and /or environmental and financial benefits.**

The scale of the potential carbon and environmental benefits is modest in this project.

It is clear from the evidence provided that there are both significant numbers of fuel poor households in Tain as well as high carbon households.

Unfortunately, in the case of the fuel poor it seems that most are at present using electricity for heating so a switch to natural gas would be a higher carbon alternative, whilst on the other hand for those that could switch from coal or heating oil (with known high carbon, polluting and market volatility characteristics), the prices of coal and oil versus gas make the economic drivers weak at present. It is against this context that the Panel was particularly keen to see concrete evidence of switching commitments, but such evidence was



lacking. The objectives to replace these high carbon fuels and to alleviate fuel poverty is a very worthwhile objective that the Panel supports, however, at present these elements do not appear to be in place. It is unclear to the Panel why fuel poor residents of Tain would choose to switch to gas heating when they are already on or have not chosen to switch to oil heating which currently costs less than gas per therm.

### **Value for Money.**

The bid does not identify any benefits for current gas customers.

If successful, it would clearly bring social benefits in terms of alleviating fuel poverty.

The Panel also believes that the project brings clear risks to gas customers' money as it relies on the longer term sustainability of the base load.

### **Generates knowledge for the NLs.**

The bid does not identify any knowledge that would be of benefit to the NLs.

### **Innovation.**

The project does not involve the testing of any new technologies but the overall system for delivering the gas safely to the end customers would be novel. The potential for rollout to other customers remote to the gas grid is tangible but given the number of potential sites of relatively modest long term potential.

The project will require the development of an alternative approach to the Uniform Network Code for use by standalone gas networks. While the development of a relative price cap was discussed with the bidders at a bilateral meeting, the Panel was disappointed that the bid gave no detail of any

significant preparatory work done to develop proposals for an alternative pricing regime. Likewise, the Panel was concerned that the proposed network would deliver a monopolistic gas supply, provided by the bidders. This clearly has implications for the competitiveness of any pricing arrangement.

The Panel agrees that this is clearly not business as usual.

### **Partners and funding.**

Each of the project partners brings specific skills and knowledge to the project. There is no funding from any of the partners to the bid, nor has there been any explicit commitment to funding from the external funders mentioned in the bid. Where bids include partner or stakeholder support critical to successful delivery, they need to demonstrate clear evidence, rather than promises, of financial or in-kind commitment.

### **Relevance and timing.**

The bid would have been considerably stronger if real commitments had been made to convert houses by landlords or private households up to a level that would have anchored the project. Whilst there were words of support, these fell well short of commitments. It would also have been preferable if Glenmorangie had already been fully committed to their part of the project. In relation to those in fuel poverty, the project would have benefited from having the funding secured to ensure that the households in fuel poverty would have the financial means to convert their appliances and connect to the network. No evidence was provided on this.

The bidder told the Panel that the future withdrawal of the reimbursement of bid preparation costs will discourage them from bidding in the future and may

have forced them to apply this year before adequate bid preparation had been completed.

### **Methodology.**

The technical part of the project plan is well thought out and was clearly explained to the Panel. However, given that the scheme is driven by a desire to alleviate fuel poverty it lacked engagement with the target users and any commitment to support them financially to connect to the new network. Whilst the bid contained letters of support from Highland Council, a local social landlord and other key local stakeholders, the Panel felt that the success of the project was dependent on firm evidence of financial and in-kind commitment from these stakeholders. This was absent from the bid.

### **Panel Conclusions.**

The Panel was impressed by the team's desire to address the issues of fuel poverty in Tain and similar towns remote from the gas grid. However, there is a lack of firm commitment from the key external stakeholders and an absence of any evidence of the level of willingness of customers, particularly fuel poor owner occupiers, to connect to the new network. Thus the Panel felt that the level of risk that the project would fail was too great given the modest benefits that might accrue.

## **3.2 Robotic Roadworks and Excavation System – Southern Gas Networks and Scotland Gas Networks - £6,326k requested (£7,304k in total)**

The project will seek to develop a Robotic Roadworks & Excavation System (RRES) which will use advanced robotics to lower the cost and improve the efficiency, safety and environmental impact of utility excavations and activity.

The RRES seeks to address the three main problems of gas utility excavations. First, the high financial and environmental costs of labour intensive operations with the attendant need for vehicles, plant and control measures. Secondly, the traffic disruption and significant CO2 emissions created by large and heavy equipment. Thirdly, the risk of damaging unknown utility infrastructure using conventional excavation techniques, which can lead to loss of supplies, disruption to customers, and significant risk of injury to operatives.

The RRES will automate and accelerate the excavation process in both rural (transmission) and urban (distribution) areas using advanced robotics. Using below-ground locating sensors, computer vision and “soft-touch” excavation tools will prevent the damage to the target asset or other buried assets.

The RRES operator will deploy and monitor the system at the designated excavation location. The system will use sensing technologies and tools to detect and excavate around buried utilities and obstacles. Soft-touch tooling will safely prevent damage to buried assets. The system will install a custom designed Universal Access Fitting on the pipe that facilitates a variety of gas main inspection and repair operations through one re-usable fitting. Finally the RRES will backfill, perform tamping to specification, and re-install the original road surface.

#### **Low carbon and /or environmental and financial benefits.**

The project has the potential to deliver significant carbon benefits by reducing vehicle movements and the reduction in cement content. If successful, then RRES would significantly reduce traffic disruption and the associated social costs. The project also has the potential to reduce the costs of a range of excavations and repairs. The benefits are spread across a range of operations and so could provide significant savings even without all of the scoped

improvements being delivered. If lane rental is widely implemented then even greater benefits will accrue from the time save in repair work.

The Panel was pleased that the benefits case was based on a realistic expectation of the likely scale of implementation.

### **Value for Money.**

The budget request for the project seemed well-calculated and reflective of the scale of work to be undertaken.

The Panel was pleased to see the commitment to a competitive process for additional suppliers and the financial contribution and track record of the project partner.

### **Generates knowledge for the NLs.**

The project would generate knowledge that would be of clear benefit to all NLs and to other utilities involved in street works or other utility excavation works.

### **Innovation.**

The scope of the project is very ambitious and clearly innovative. The discussion during the bilaterals reassured the Panel that, even if the fully automated vision was not delivered then there were potential benefits from all of the elements being tested and a clear plan to gauge these.

This is clearly not business as usual.

### **Partners and funding.**

SGN and ULC have now collaborated on a number of successful projects and it was obvious to the Panel that this is a progressive, well-balanced and effective team. The Panel was pleased to hear that the team will engage with the UK Manufacturing Technology Centre. The Panel would encourage other NLs to develop similar partnerships with other technology partners.

The Panel was pleased that ULC are making a £200,000 contribution to the project. The Panel also noted that ULC are now working through a local subsidiary so building capability that can be extended to other utilities in Europe.

### **Relevance and timing.**

Work is already beginning on the next round of RIIO price controls so it is timely for the NLs to be proposing demonstration projects that could help inform that process.

### **Methodology.**

The methodology is soundly based and the Panel was given greater reassurance on this by the answers to the questions in the bilaterals.

The Panel was pleased that the bid had waited to undertake further background work under the NIA as this gave much greater confidence in the likely success of the project as a NIC project as it started from a higher TRL. This improved the potential deliverability of the work plan.

### **Panel Conclusions.**

The Panel welcomed the bid which is ambitious but focused on a real business need with the potential for significant environmental and financial benefits for the gas customer. The project is high risk but the strength of the partnership between SGN and ULC and their track record on other NIC funded projects gives the Panel confidence that there is a good chance of success. Whilst the Panel recognised that the full objectives for the project may not be met, nevertheless implementation of aspects of the solutions developed could be put into business as usual delivering significant benefits for gas consumers

### **3.3 H21 - Northern Gas Networks - £13,310k requested (£15,172k in total)**

The project will aim to provide quantified safety-based evidence to confirm that the GB gas distribution networks (GDNs) are suitable to transport 100% hydrogen. The evidence produced will be used to support the case for a GB hydrogen conversion that could represent the biggest single contribution to the achievement of the 2050 carbon targets and the legal obligations of the Climate Change Act.

The H21 Leeds City Gate NIA project concluded it would be technically possible and economically viable to fully de-carbonise the GDNs by converting them from natural gas to 100% hydrogen. The safety-based evidence for such a conversion needs to be provided before the viability of the option can be confirmed. A government policy decision on de-carbonisation of heat would not be possible without this critical information

The Project will undertake an experimental testing programme which will aim to provide the empirical safety evidence that 100% hydrogen can be utilised within the existing GDNs. The project has three phases. In Phase 1A background testing will be undertaken at the Health and Safety Laboratories in Buxton. These tests will confirm potential changes in background leakage levels. In Phase 1B consequence testing will be undertaken by DNV GL at

Spadeadam. These tests will confirm any changes to safety under background conditions, failure and operational repair.

Field trials would be undertaken in Phase 2. These trials will be undertaken on an in-situ, but isolated, mains to corroborate the controlled results gathered in Phases 1A and 1B. These tests will not be undertaken downstream of the meter and will not affect customers gas supply.

BEIS's *Clean Growth Strategy* notes that "Clean fuels such as hydrogen and bio-energy could be used for transport, industry, and to heat our homes and businesses. We need to test how they work in the existing gas network, whether they can fire industrial processes, and how they could be used in domestic appliances. These options need to work as well and as cheaply as current technologies." (BEIS, 2017, p53).<sup>1</sup> In order to collect the evidence to propose a clean growth strategy "We will therefore need to lay the groundwork this Parliament so we are ready to make decisions in the first half of the next decade about the long term future of how we heat our homes, including the future of the gas grid... This includes support for innovation to test and bring down the cost of low carbon heating technologies, many of which are currently too expensive." (p 75).

The BEIS approach to evidence collecting includes a £25 million programme to explore the potential use of hydrogen gas for heating UK homes and businesses. This programme will run from 2017 to 2020 and will aim to define a hydrogen quality standard, and to develop and trial domestic and commercial hydrogen appliances. This project will assess the viability of using hydrogen for heating and cooking, but for hydrogen to replace natural gas it must be feasible to deliver hydrogen to the premises. The H21 project aims to test the capability of the GDNs to deliver hydrogen over its networks from the

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<sup>1</sup> At <https://www.gov.uk/government/publications/clean-growth-strategy>



hydrogen source (a steam methane reformer equipped with CCS) to customers. Both the upstream and downstream hydrogen capabilities need to be assured before the Government can mandate a sequential shift from gas to hydrogen, and Government would like to have the evidence base by 2021.

### **Low carbon and/or environmental and financial benefits.**

A solution is required to de-carbonise heat. A conversion to 100% hydrogen could be significantly cheaper than an all-electric option. The benefits for converting just 1 in 3 of UK gas customers to 100% hydrogen have been estimated to provide a £48bn financial saving compared to an electric option and could save a cumulative total of 363m tonnes of carbon by 2050.

### **Value for Money.**

The Panel considered very carefully whether gas customers, rather than tax payers, should be paying for this bid on what is, essentially, evidence to inform a future government policy decision. On balance, the Panel decided that it was reasonable for gas customers to make a contribution to the development of a potentially lower cost least regrets pathway to a safe, secure, and sustainable de-carbonised network.

The Panel viewed the work in Phase 1 as necessary to enable the Government to make a policy decision in 2021 on the routes for de-carbonising heat. The work programme seems appropriate for providing robust information to enable that decision to be taken.

It appears to the Panel, from questioning BEIS, that the key deliverable for a first live trial would be to test consumer acceptance for hydrogen appliance adaption. This is very different from the trial envisaged in Phase 2, the design of which could be very different and would be better done after the initial

testing is completed. The work envisaged under Phase 1 will be sufficient to support a decision on a policy direction and a decision on the form of any trials seems premature at this time.

The Stage 2 field trial requires 12 months to complete and there is, therefore, time to complete Phase 1 and then decide, in discussion with the HSE, whether Phase 2 is required or whether one can go to Phase 3 and the consumer trial. The Panel saw value to customers in Phase 1 but it does not seem necessary to commit now to Phase 2 given that, according to BEIS, the target date for Phase 3 is after 2021.

The Panel was pleased to see that the bidders were bringing in evidence from other countries, for example, work undertaken in the Netherlands and by Statoil in relation to CCS. It is useful that the work was being undertaken elsewhere to ensure the evidence required on full scale implementation could be in place when needed.

### **Generates knowledge for the NLs.**

The project would generate knowledge on how well the existing network equipment would cope with 100% pure hydrogen. This information would also allow the NLs to specify new and replacement assets to be hydrogen ready.

### **Innovation.**

This project is innovative and testing the existing network equipment to ascertain how they would perform with 100% hydrogen has not been done elsewhere.

This is clearly not business as usual.

### **Partners and funding.**

The partners chosen are widely recognised as leaders in the work that will be undertaken in the first phase.

DNV GL is making a £261,000 contribution to Phase 1b of this project.

### **Relevance and timing.**

The Panel agreed that the work in Phase 1 was needed and timely to complement the BEIS programme on hydrogen-ready appliances. Taken together the information generated will allow a policy decision to be taken in 2021 with the first 100% hydrogen being supplied from 2030 onwards. If Phase 1 shows that there is a requirement for Phase 2 there is either time for a further NIC bid or an alternative to funding from gas consumers only.

### **Methodology.**

The Panel believed that the methodology was sound and well-evidenced.

### **Panel Conclusions.**

The Panel felt that was timely and sensible to test the elements of the GDNs that have not yet been certified as fit for handling hydrogen. The programme of replacing 90% of local pipes with polyethylene should be completed before any significant conversion to hydrogen takes place, and polyethylene is fully capable of transporting hydrogen. The lack of evidence relates to the other equipment on the network such as meters, governors, valves etc. and the remaining pipes which have not yet been converted to polyethylene. Phases 1a

and 1b of the project aim to test all relevant components in laboratories and should produce evidence of any equipment that is potentially non-compliant.

BEIS indicated to the Panel that it expects to conduct a field trial of consumer acceptability in the early 2020s after it has established that hydrogen can be safely used in homes and businesses with suitably adapted appliances. This, as discussed above, would seem to be the obvious time to conduct an appropriate field trial on the GDNs.

The cost of switching from gas to hydrogen is extremely high in terms of the cost per tonne of CO<sub>2</sub> abated. Either costs will have to fall substantially (which will take time), or a very large range of other abatement options require to have been exhausted before hydrogen replacement makes sense. The cost of carbon abated from the switch to hydrogen, using data from p259 of the Leeds City Gate H21 report (but correcting some of the assumptions on taxes and margins), can be shown to be around £200/tonne of CO<sub>2</sub>. That can be compared to the 2030 price projection used to justify the Treasury's carbon price floor for the electricity sector of £78/tonne in current prices. It therefore seems most unlikely that a full-scale conversion to hydrogen will happen much before the 2030s, and even then the process of conversion would likely be one local network at a time, starting with those that require the least conversion cost.

The least regret strategy to follow in the case of such uncertainty about cost and technological readiness (of CCS etc.) is to ensure that all future repairs and replacements to the GDNs use equipment that is hydrogen compliant, as it would be more expensive to replace post 2020 repairs and replacements which had not been assured to be hydrogen compliant. The main function of Phase 1 of H21 is to identify which equipment is already compliant, and which is not, and which could therefore require NLs to change their maintenance strategy. By the time the least compliant parts of the network are required to be

compliant, a significant proportion of replacement and repair will already have been undertaken (and financed) as part of the RIIO price control process, reducing their adaptation cost.

Phase 1 of the H21 project is a modest cost project to open up a potentially valuable option of considerably reducing the future network cost of adapting to hydrogen. Crucially, not all parts of the existing GDNs need to be tested for compliance, and the relevant and timely information needed is what parts (if any) of the most hydrogen-ready network need replacement to satisfy HSE in order to conduct the planned BEIS consumer acceptance field trials. A decision on the form of any subsequent network trials seems premature at this time.

#### **4 Recommendations to the Authority**

**4.1** We set out below our recommendations to the Authority on the funding of the 2017 projects.

**4.2** The Panel recommends that the Authority does not fund the following project

**- Tain Innovative Gas Grid - Fulcrum Pipelines Limited - £2,139k requested (£3,728k in total)**

**4.3** The Panel recommends that the Authority funds the following projects.

**- Robotic Roadworks and Excavation System - Southern Gas Networks and Scotland Gas Networks - £6,326k requested (£7,304k in total)**

**- H21 Part funded (Phase 1 only) - Northern Gas Networks - £8,920k requested (£10,246k in total)**

**4.4** In Section 2, we have set out a number of observations on the evaluation process. Overall, the Panel was pleased with the quality of the bids submitted and the way in which most of the Project Teams conducted themselves in the bilaterals. There is clear evidence that the NLs are learning from feedback on previous bids and that they are developing stronger partnerships with technology partners. It was pleasing to see several of the partners making a financial contribution to the projects.

Ofgem have changed the NIC rules and no longer include the requirement for change control and for successful delivery rewards. These changes require the NLs to be much clearer on the project deliverables in their submission and the Panel will be scrutinising these carefully.

The Panel read the submissions very carefully and the questions asked are intended to help strengthen the bids. One bidder fully engaged in the bilateral process and clarified and improved their bid as a result. Another engaged in the process but failed to clarify their bid significantly. The third bidder seemed to take the view that most of the evidence required was already in the bid so failed to respond fully to the questions asked.

All the bids were comprehensive, detailed and readable and were clearly cross referenced to the Gas NIC criteria. The Panel saw evidence that the removal of bid preparation costs in future NIC rounds will reduce the number of bids coming forward.

The bids teams presented their projects in a dynamic and enthusiastic manner.

The bids increasingly refer to evidence from previous NIA and Gas NIC projects. There is also an increasing willingness to look in more detail at international experience and to extract learning from this. The NLs are increasingly drawing on third parties, including both suppliers and academics

for fresh ideas. It has been encouraging to see how the vision of the potential role of the gas network in supporting a low carbon economy at least cost to consumers has developed since the Gas NIC began in 2013.

The Panel is pleased to see a significant body of knowledge being developed with NIC funding that will support a cost-effective adaptation of the GDNs to a low carbon agenda.

- 4.5** The Panel would like to thank the project teams for their hard work and for their engagement during the evaluation process; we would also like to thank the external consultants and the Ofgem team for all the support and assistance provided.