

Gas Network Innovation Competition Screening Submission Pro-forma

Notes on completion			
<p>Before completing this form, please refer to the Gas Network Innovation Competition (NIC) Governance Document, which details all of the information that you are required to provide.</p> <p>Please use Verdana size 10 font in your submission. The text entry areas are suggestions and the size of each text area can be altered if you need to provide more information in one section and less in another. In all cases the full-completed submission should not exceed 11 pages in total.</p> <p>Ofgem will publish all the information contained within the Screening submission.</p>			
Funding Licensee			
National Grid Gas Plc (Transmission)			
Network Licence Project Partners			
Funding Licensee area <i>(or where the licensee does not operate in a specific area the geographic location(s) of the Project)</i>			
National Grid Gas Transmission (NGGT)			
Project title			
A New Approach to NTS Connections			
Project Summary			
<i>The Licensee must provide an approximate Project start and end date.</i>			
<p>This project will enable NGGT to work with customers in a way that ensures they connect on to the gas transmission network in the most appropriate way and at the most appropriate point. Currently the cost and time required for an NTS connection can either prevent a project going ahead or lead to a sub optimal connection on either the transmission or distribution network. Making use of innovative technology and processes, this project will allow a connection to be designed and built that is optimally sized for the customers' immediate and future needs which in turn will lead to the minimisation of the cost and lead time of the customer's connection to the NTS. To minimise connection costs, the project will develop innovative connection systems that are suited to the development and life expectancy of the individual projects. To minimise the duration of the connection application process the project will deliver enhanced processes within NGGT to facilitate a new flexible connections process which may result in modifications being made to the Uniform Network Code (UNC). Through extensive customer engagement, the project will deliver a web based, decision support tool and connections guide for the customer thereby optimising the connection.</p>			
Estimated Project funding			
<i>The Licensee must provide an approximate figure of the total cost of the project and the NIC funding it is applying for.</i>			
Total cost of Project	£5,500,000	NIC funding requested	£4,950,000
Cross Sector Projects only: Requested funding from Electricity NIC or NIA?	<i>If yes, please specify</i>		

Problem(s)

The Licensee must provide a narrative which explains the Problem(s) which the Project is seeking to address.

Changes in the energy sector mean that customers can see value in connecting to the gas transmission system in a way that was not viable or foreseen in the past. In particular, those developing indigenous gas supplies see value in connecting to the NTS because of location and/or the benefits of a higher pressure network. However, these customers are quite different to traditional NTS connections and therefore can find that the existing connection regime does not meet their project's requirements.

National Grid is looking to make the best use of the existing assets that make up the gas transmission network. The NTS connects into all 12 local distribution zones and comprises 2700km of pipeline and over 250 block valve sites. Facilitating new types of connections will allow NGGT to maximise the usage of the high pressure network and provide additional benefit to all customers.

In terms of the current process, third parties looking to connect on to the NTS need to follow the 'Application to Offer' (A2O) process, which has been used to effectively connect gas fired power stations and other similar large connections over the past 2 years. However, the current application and connection process can be prohibitive for smaller or shorter term projects as it can cost up to £2m and take up to 3 years to deliver. As a number of future energy scenarios¹ have a significant portion of indigenous gas, it is vital that steps are made to ensure that customers of these types of connections can be offered the optimum connection solution. The timing of this project is therefore critical; by 2020 it is anticipated that there will be a substantial number of shale gas connections, and by 2035 shale gas alone could supply up to 32 billion cubic metres (bcm) per year². It is essential that an innovative approach is developed to enhance the existing connections regime in terms of both process and design to ensure that the future needs of customers' connection requirements can be met.

¹ <http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Future-Energy-Scenarios/>

² <http://www.iod.com/influencing/policy-papers/infrastructure/infrastructure-for-business-getting-shale-gas-working>

Method(s)

The Licensee should describe the Method(s) which are being demonstrated or developed. The Licensee must outline how the Method(s) could solve the Problem. The type of Method should be identified where possible eg technical, commercial etc.

The project looks to engage with customers to develop three streams of work:

- A. New types of connection systems: develop and trial engineering solutions to meet customer requirements
- B. New commercial processes: investigate and deliver the required changes to the commercial regime such that it is streamlined to meets customer needs.
- C. A web based user tool: develop a web based tool to enable customers to compare and assess options for NTS connections.

All three streams will be developed in parallel but with a high degree of interaction and feedback as well as strong focus on customer engagement. This will be developed through the following process:

Market Assessment, Tech Watch and Feasibility Studies

The market assessment will provide a matrix of connection options (e.g. green field site, connection through existing NTS assets, hub etc.) against the various technical parameters. In addition, the tech watch will provide an international understanding of

Method(s) continued	
<p>key gas supplies and gas parameters (flow profiles, pressures, gas composition etc.) of different unconventional gas types such as bio-gas, shale and coal bed methane. The project will also undertake a review of existing legislation, standards, specifications and codes of practice that are currently applied to NTS connections and develop a strategy document following stakeholder engagement and feedback.</p> <p><u>Conceptual Design and Strategy Development</u> Standardised designs will be developed for connecting new gas supplies to the NTS using best available technology and techniques, for example, transportable skid facilities or hub systems. The project will undertake extensive customer engagement relating to new types of connection to ensure that any issues with the current commercial process can be addressed and to provide a strategy and options analysis. The concept design for the web based tool will be developed in this phase. This user tool will provide a quick and efficient interface for determining the customer's connection options.</p> <p><u>Detailed Design, Build and Test and Business Readiness</u> The project will then build, test and commission a connection system based upon industry best practices and innovative methods to prove the proposed new solution can meet the customer's particular development needs. There will be ongoing stakeholder engagement as new commercial processes are tested and implemented. The web based user tool will be built and tested during this phase.</p>	
Funding commentary	
<p><i>The Licensee must provide a commentary on the accuracy of its funding estimate. If the Project has phases, the Licensee should identify the approximate cost of each phase. IGTs should indicate potential bid costs expenses.</i></p> <p>The NIC bid preparation funds will be used, in part to carry out initial stakeholder engagement sessions with customers, other licensees and trade organisations.</p> <p>The total cost estimate for the project is £5,500,000 and an interactive breakdown by stage is as follows:</p> <p>Stage 1: £350,000 Market Assessment, Tech Watch and Feasibility Studies Stage 2: £900,000 Conceptual Design and Strategy Development Stage 3: £4,250,000 Detailed Design, Build and Test and Business Readiness</p>	
Specific Requirements (please tick which of the specific requirements this project fulfils)	
A specific piece of new (ie unproven in GB) equipment (including control and/or communications systems and/or software)	X
A specific novel arrangement or application of existing gas transmission or/and distribution equipment (including control and communications systems software)	X
A specific novel operational practice directly related to the operation of the gas transportation system	X
A specific novel commercial arrangement	X

Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to existing and/or future Customers

The Licensee must demonstrate that the Solution has the potential to accelerate the development of the low carbon energy sector in GB and/or deliver wider environmental benefits to GB Customers. The Licensee must demonstrate the potential to deliver net financial benefits to existing and/or future Customers.

As stated in the Gas NIC Governance Document, the Network Licensee must provide the following to demonstrate compliance with this criterion:

- i. How the proposed Project will make a contribution to the Carbon Plan. In particular the Network Licensee should outline:*
 - What aspects of the carbon plan the Solution facilitates;*
 - The contribution the roll-out of the Method across GB can have in facilitating these aspects of the Carbon Plan;*
 - How the roll-out of the proposed Method across GB will deliver the Solution more quickly than the current most efficient Method in use in GB; and/or*
- ii. How the proposed Project could deliver environmental benefits to Customers; and*
- iii. The expected financial benefits the Project could deliver to Customers.*

ii. This project will maximise the potential to fully support the development of future indigenous gas sources, offering options for high pressure connections onto the NTS that may otherwise be commercially unviable. Additionally, the project should allow new types of exit connection (such as to facilitate Compressed Natural Gas projects) to be supported. Although shale gas, like other forms of gas, cannot be regarded as a low-carbon fuel source, it can, however, have lower lifecycle emissions than imported liquefied natural gas (LNG). The connection of indigenous sources such as shale gas over the transportation of LNG would save in the order of 5g CO₂ equivalent per mega joule of natural gas¹ and as previously stated, shale gas supplies could reach up to 32 bcm per year by 2035. The 32 bcm of shale gas equals 1264 billion mega joules (bMJ), so if the indigenous gas replaced 100% of the LNG in the most extreme scenario, that would represent a saving of 6 million tonnes CO₂ equivalent per year.

iii. All NTS connection costs are directly payable by the customer therefore all the project benefits directly translate into customer savings. Current connections can cost up to £2m and can take up to 3 years to deliver. Additionally, current connection solutions are sized and designed to meet the maximum flow rate or gas delivery over the lifetime of the project. By taking an innovative approach, and for example utilising a modular design, the proposed solution would allow for the connection assets to support a particular project needs as they change over time, which should lead to a more economic and efficient solution being delivered to the customer. This project aims to provide a solution that will substantially reduce the resultant cost and time for a connection (to less than £1m and take less than 1 year).

¹ <http://www.theccc.org.uk/wp-content/uploads/2013/04/Reducing-carbon-footprint-report.pdf>

Delivers value for money for gas Customers

The Licensee must demonstrate that the Method(s) being trialled can derive benefits and resulting learning that can be attributed to or are applicable to the gas transportation system.

As stated in the Gas NIC Governance Document, the Network Licensee must provide the following to demonstrate compliance with this criterion:

- i. What is the potential Direct Impact of the Project on a Network Licensee's gas network or on the operations of the GB System Operator;*
- ii. Justification that the scale/ cost of the Project is appropriate in relation to the learning that is expected to be captured;*
- iii. The processes that will be employed to ensure that the Project is delivered at a competitive cost;*
- iv. The expected proportion of the benefits which will accrue to the gas transportation system as opposed to other parts of the energy supply chain.*

Sub-criterion v (the internal systems, procedures and processes used by the Network Licensee to identify Project Participants and Project ideas) should be covered in the 'Project Partners and external resourcing/funding' section, below.

- i. The project will deliver options for new types of connection systems to allow indigenous gas sources to connect to the NTS in a cost effective and timely manner.
- ii. The £5m project cost is appropriate considering the potential for saving over £1m per connection. Assuming 32 bcm per year of shale gas by 2035, this would represent 100 shale gas pads (each containing multiple wells)¹. If this resulted in 100 connections in the next 20 years, total savings could be in the region of £100m.
- iii. The project will be subject to robust project management practices including a stage gate process over the project lifecycle. NGGT will establish a Project Management Board with other partners to ensure the project is managed to time and budget. For all procurement activity, a competitive tender process will be carried out.
- iv. The project will benefit the wider energy sector as it will become easier for customers looking for connections to the gas networks to assess a wider number of options and then identify the optimum solution. The facilitation of indigenous gas onto the gas transportation networks has the potential to underpin energy security of supply for the future.
- v. Project partners have been selected through a process that started with the identification of priority themes for gas transmission. All the different aspects of the gas transmission business were represented and a workshop was held, from which ten themes were identified: unconventional gas, outage minimisation, zero emissions compressor station working towards a zero emissions NTS, alternative pipelines materials and construction methods, facilitation of highly flexible power plant, full lifecycle management of materials, information to end customer "best way to heat your house", third party interference, asset health and intelligent asset management and sensors/non-destructive testing. These themes were published on the National Grid website and circulated via email to all the NGGT innovation contacts and via LinkedIn. Ten proposals were received from various innovation partners and these were compared and scored against the NIC criteria and NGGT's innovation strategy. This proposal is the successful candidate. The project partners are Premtech, Protech and Aqua, with Premtech in particular having a very strong track record in the NIA and NIC. This project will be very collaborative in nature, with the commercial and customer engagement activities equally as important as the technical aspects.

¹ <http://www.iod.com/influencing/policy-papers/infrastructure/infrastructure-for-business-getting-shale-gas-working>

Demonstrates the Project generates knowledge that can be shared amongst all Licensees

The Licensee must explain the learning which it expects the Method(s) it is trialling to deliver. The Licensee must demonstrate that it has a robust methodology in place to capture the learning from the Trial(s).

As stated in the Gas NIC Governance Document, the Network Licensee must provide the following to demonstrate compliance with this criterion:

- i. What new knowledge is intended to be generated from completing the Project;*
- ii. What methodology will be used to capture results from the Project and how the Project's results will be disseminated to other Network Licensees; and*
- iii. Whether the Network Licensee wishes to conform to the default IPR arrangements as set out in Chapter 9. If the Network Licensee wishes to deviate from the default IPR arrangements it must outline the proposed arrangements, justify why the arrangements are more suitable than the default arrangements and justify how the new arrangements will deliver value for money for Customers.*

i. Key knowledge outputs:

- a) Development and trial of an innovative system that can be used to connect a variety of different customers/ supplies into (or offtakes from) the NTS. For example, this could involve producing a design philosophy for flexible and dynamic transportable skid units which would allow them to be commissioned for new connections or even replace aging assets at other locations.
- b) New standards, processes and methodologies designed specifically for the connection of unconventional gas into (or new types of offtake from) the NTS.
- c) Process for selecting and assessing connection applications. This would involve a software-based feasibility calculator into which customers could input their operating parameters and the software would suggest the type of connection available along with costs, timeframes and possible requirements.

The project team will ensure that the learning from these key knowledge outputs will be shared openly and proactively with the gas distribution networks, particularly where they are facing similar commercial and technical challenges.

- ii. The project manager will prepare update reports identifying all relevant knowledge gained to the Project Management Board at least twice yearly. These will be circulated to all internal and external stakeholders. These reports will also be shared at the GIGG (Gas Innovation Governance Group), comprising all the gas network licensees. The project will have a dedicated website and other media options such as video, LinkedIn and the National Grid Connecting site will be used for the publication of project progress information. Results and project learning will be reported at the annual LCNI (Low Carbon Networks and Innovation) conference and as part of the annual Network Innovation report.
- iii. The project will conform to the default IPR arrangements.

Please tick if the project conforms to the default IPR arrangements set out in the NIC Governance Document?	X
<i>If the Licensee wishes to deviate from the default requirement for IPR then it must demonstrate how the learning will be disseminated to other Licensees and how value for money will be ensured. The Licensee must also outline the proposed alternative arrangements and justify why the arrangements are more suitable than the default arrangements.</i>	
How is the project innovative and with an unproven business case where the innovation risk warrants a limited Development or Demonstration Project to demonstrate its effectiveness.	
<i>Demonstrate why the Licensee has not previously used this Solution (including where the Solution involves commercial arrangements) and why NIC funding is required to undertake it. This must include why the Licensee would not run the trial as part of its normal course of business and why the Solution is not Research.</i>	
<i>As stated in the Gas NIC Governance Document, the Network Licensee must provide the following to demonstrate compliance with this criterion:</i>	
<ul style="list-style-type: none"> i. Why the Project is innovative and has not been tried before; ii. Why the Network Licensee will not fund such a Project as part of their business as usual activities; iii. Why the Project can only be undertaken with the support of the NIC, including reference to the specific risks (e.g. commercial, technical, operational or regulatory) associated with the Project. 	
<p>There is currently only one process for customers to connect onto the NTS, which is the A2O process. This was designed and works effectively for a small number of large connections. However, the changing energy landscape, with the opportunities for indigenous gas developments in the UK and new types of exit connection, is driving the case for a suite of solutions that can be optimised to enable more flexible and dynamic individual customer connections to be delivered.</p> <p>The project will deliver a package of outputs that combines to give an innovative approach to NTS connections. Specifically the flexible, scalable approach of the technical solution will be supported by a novel commercial approach underpinned by extensive customer engagement and interface.</p> <p>The NIC provides the correct platform for the project. There are a number of technical risks associated with the development of new types of connection systems suitable for a high pressure gas connection, and there is also commercial risk, in particular the development of any potential UNC modifications. As the project benefits will pass directly back to the customer (all connection costs are directly paid by the customer), this would not be funded through business as usual activities and so the NIC is the most appropriate platform for this work.</p>	

How is the project innovative and with an unproven business case where the innovation risk warrants a limited Development or Demonstration Project to demonstrate its effectiveness - continued.

Project Partners and external resourcing/funding

The Funding Licensee should provide a description of the internal systems, procedures and processes used by the Funding Licensee to identify Project Participants and Project ideas.

The Funding Licensees should also include details of any Project Partners, External Funders or Non-Network Licensees who will be actively involved in the Project and are prepared to devote time, resources and/or funding to the Project. If the Funding Licensee has not identified any specific Project Partners, it should provide details of the type of Project Partners it wishes to attract to the Project.

Project partners have been selected through a process that started with the identification of priority themes of gas transmission suitable for the 2015 NIC. All the different aspects of the gas transmission business were represented (asset management, market operations, safety, sustainability and resilience, capital delivery, transmission network services and RIIO delivery) and a workshop was held, from which the ten themes were identified. These themes were published on the National Grid website and circulated via email to all the NGGT innovation contacts and via LinkedIn. Ten proposals were received from various innovation partners and these were compared and scored against the NIC criteria and NGGT's innovation strategy. This proposal was the successful candidate.

At this stage three partners have been identified:

Premtech will provide fully constructible standardised designs along with engineering, consultancy and design management services on the project; utilising their vast experience in the design of high pressure gas systems to ensure that the correct design standards are applied and safety standards are not compromised.

Protech is an engineering consultancy with experience of engineering projects from the feasibility/conceptual stage through to the detailed design, with the majority involving natural gas processing and transportation. Protech will bring process design experience in unconventional gas field development, gas storage, gas treatment and bio-gas processing to the project.

Aqua Consultants is a project management consultancy operating in the UK utilities sector. Founded in 2008, Aqua has worked in collaboration with the UK water companies and Gas Distribution Networks to develop commercial engineering tools, delivering cost and schedule efficiencies to their Capex and Repex programmes. Aqua will provide commercial modelling, programming and develop the web based user selection tool for the project.

Derogations or exemptions

The Licensee should outline if it considers that the Project will require any derogations, exemptions or changes to the regulatory arrangements.

N/A

Customer impact

The Licensee should outline any planned interaction with Customers or Customers' premises as part of the Project, and any other impacts (such as amended contractual or charging arrangements, or supply interruptions).

N/A

Details of cross sector aspects

The Licensee should complete this box only if this Project forms part of a larger cross sector Project that is seeking funding from multiple competitions (Gas NIC and Electricity NIC). The Licensee should explain about the Project it will be collaborating with, how it all fits together, and must add a justification for the funding split.

Any further details the Licensee feels would add to the submission

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Job title	Job description	Job location	Job type	Job status	Job category	Job code	Job grade	Job level	Job band	Job grade	Job level	Job band
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Gas Transmission Innovation Manager