Annual summary

nationalgrid

Network Innovation Allowance

2013/14

Gas Distribution

Contents

Introduction

Welcome to the first Annual [Innovation] Summary for National Grid Gas Distribution under the Network Innovation Allowance.

We have seen significant change to our business over the past financial year (2013/14) with the implementation of the new RIIO-GD1 eight year price control. We have embraced the transition from the Innovation Funding Incentive (IFI) to the two new funding mechanisms for Innovation: the Network Innovation Allowance (NIA) and the Network Innovation Competition (NIC).

Under the NIA funding mechanism we have developed a number of collaborative partnerships with the other Network Operators, Industry Bodies and Institutions and Supply Chain partners.

Our approach has provided us with a diverse portfolio of innovation projects, with a strong focus on delivering great customer service and putting the customer at the heart of what we do. Our portfolio has included projects such as: minimising our impact on customers due to streetworks, through the use of keyhole and robotic technologies, asset remediation and life extension, and the development of asset risk methodologies.

Under the NIC funding mechanism, we successfully secured £2million funding for a 3 year BioSNG Demonstration Plant project. This project is testing the feasibility of producing Biogas from domestic waste and will be used to supply domestic appliances with gas. This project is an excellent example of innovation that will contribute to increase the UK's potential supply of renewable gas and driving a low carbon economy.

As we progress through our second year under RIIO-GD1, we are committed to building on our track record of driving Innovation throughout the organisation and within our industry. We are building on existing collaborative partnerships and looking to develop new ones. This approach will help us to continue to deliver the greatest customer value, reduce our environmental impact and ultimately expand our breadth of Innovation activities for the benefit of all our stakeholders.

Emma Fitzgerald,
Director of National Grid Gas Distribution

Innovation strategy

Strategic themes

Our strategy identifies five key themes of focus for our innovation activities, which have been demonstrated through the range of innovation projects we have commissioned under each theme.

Strategic theme	
1 **Efficient and safe work delivery and removal of risk**	This theme is focused on the challenge of delivering of our mains replacement programme based on an approach that removes risk. We are looking to develop improved mains replacement technology and techniques, to minimise risk so we are more efficient and safe with less disruption to the public.
2 **Asset condition and network optimisation**	This theme involves looking at the resilience of our assets and their ability to adapt to the consequences of climate change such as incremental hotter, drier summers, erratic fluctuations in temperatures, and extreme weather events such as floods.
3 **Transition to low carbon economy and minimise environmental impact**	This theme addresses the challenges associated with the changing energy landscape and the need for us to transition to a low carbon economy. We will also need to continue our focus on reducing our impact on the environment and minimising our business carbon footprint emissions. In addition, specific Government mandated initiatives will clearly present new challenges such as the roll out of smart metering.
4 **Improve customer and stakeholder satisfaction**	We will consider more innovative ways to improve the service we deliver to customers such as the challenge to minimise supply losses and getting customers' supply restored as quickly as possible.
5 **Enhanced industry frameworks and commercial services**	We will need to consider innovative commercial and regulatory frameworks to help us best manage future uncertainties such as volumes of biomethane connections to our networks. We will also look to develop innovative approaches to solving problems of theft of gas, to encourage new capacity products, and the use smart data and new charging methodologies.

Our innovation strategy has an essential role to play in our success, setting the direction and focus of our innovation activities so we can successfully deliver and outperform against the RIIO-GD1 price control and deliver benefit to our customers.

Prioritisation of innovation
The projects selected for delivery have been fully aligned to our innovation strategy, incorporating both short and long-term value to customers.

Innovation ideas have been received from a number of diverse organisations. All ideas were reviewed and assessed for suitability and eligibility, and sanctioned through a governance process to ensure we could generated the highest possible value.

The projects taken forward into development cover all of the strategic areas and provide a full range of innovation topics that we believe have the potential to give the highest customer benefits.

Organisational Approach
The innovation project portfolio is managed by a dedicated central team, with support from expert technical leads to ensure end user support and engagement.

The projects are managed by a project manager and overseen by project specific steering groups. These consist of representatives from all stakeholders including suppliers to ensure that the projects satisfy the success criteria.

We intend to expand the team to deliver greater customer value through more innovation opportunities. We are also looking to create an innovation performance group to further escalate the visibility and priority of innovation in the organisation.

Strategic Focus for 2014/15
Our focus for 2014/15 is to create more value for our customers. We will do this by taking advantage of further innovation opportunities and increasing our engagement throughout the industry and with new partners who operate outside of our sector. The creation of the steering group will consist of representatives from all core functions of the business ensuring collective strategic direction and commitment to implementation, while stimulating further ideas.

We will continue to initiate and deliver projects that align with our RIIO Innovation Strategy, with a focus on delivering the best customer value that we can.

Our innovation projects are focussed on delivering benefits to our customers and reducing the impact that our works have on day to day life.

Network Innovation Allowance: Projects in 2013 /2014

Throughout the year, our innovation portfolio has included a number of key projects that have the potential to revolutionise the way we work as a business. We have identified seven main objectives and summarised our innovation activities under each of these areas.

Customer experience

Improve our customer and stakeholder experience through innovative and creative engagement and communication techniques to ensure they are fully aware of our activities and performance, particularly those that have a direct impact on their lives.

Projects in this area have focused on ensuring the safety of our customers such as the Customer Self Isolation Project which looks to safeguard life and property during major gas incident and our Optical Methane Sensing Project which helps us to more accurately and effectively detect gas leaks in ducts. Other projects in this space focus on improving the service we provide to customers and seeks to reduce the impact that our works have on our customers and their livelihoods.

Customer interruptions (streetworks)

Reduce the size and duration of all of our street works activities that affect our customers and stakeholders, minimising disruption and reducing cost.

The focus in this area of projects is to reduce the impact that our street works activities have on our customers. Work that needs to be carried out on our underground assets can cause an inconvenience to our customers and stakeholders, as we need excavations in highways and footpaths so we can access our assets to repair or replace them. Projects such as CISBOT that look to remotely repair our assets from a single excavation demonstrate how the use of technologies such as robotics can significantly reduce the number of excavations we would require. This reduces the impact we have on our customers' daily lives.

£5.1m

In 2013/14 we committed £5.1million to Innovation Projects under the Network Innovation Allowance and Network Innovation Competition.

Life extension

Extend the life and reliability of our assets through monitoring and new remediation techniques, increasing the use of our assets and their efficiency.

As a main focus of our innovation portfolio, life extension projects seek to identify efficient ways to repair and remediate our assets. These projects help us to re-prioritise our replacement works to those assets most in need of replacement . They also drive cost savings. Projects such as our Iron Mains Condition Assessment focus on accurate asset inspection using sensor technology to determine the exact condition of pipes to determine their remaining life. Other projects such as PE Asset Life Research aim to bring industry standards to assessing and inspecting the condition of assets, as well as accurately predict their expected life and plan required work.

Environment

Reduce our impact on the environment and wherever possible have a positive effect in the environment in which we work.

These projects are focused reducing the environmental impact of our gas network and activities. Our venting controllers project is an example that highlights how we are looking to reduce the levels of gas vented into the atmosphere from our above ground installations. Our Mono Ethylene Glycol (MEG) Improvements project is developing techniques that restore leaking joints, so we can reduce the levels of gas that escapes, and therefore reducing our environmental impact.

Network Innovation Allowance: Projects in 2013 /2014 *continued*

40

We had 40 projects in our innovation Portfolio during 2013/14

£$

Cost efficiency

Continually reduce the cost of running our network by improving the efficiency of assets and the cost effectiveness of our plans and decisions.

Cost efficiency is an important area for the business and forms a significant part of our innovation portfolio. Projects such as our Tier One Replacement System project aim to revolutionise the way we carry out mains replacement, dramatically reducing the time and number of excavations required to carry out the work, and delivering significant cost efficiencies. Projects such as Cured In Place Pipe, which look to repair certain assets rather than replace them, is another key cost efficiency project. It could contribute to a substantial reduction in our costs.

Unconventional supplies

Open up the use of our network to alternative energy sources (shale, hydrogen, BioSng).

Projects under this theme are focused on introducing alternative energy supplies to the network, such as bio gas. These projects look at the feasibility of introducing these gases, as well as to explore the potential issues that could be posed by the network and identify where work needs to be conducted to facilitate these unconventional supplies.

22

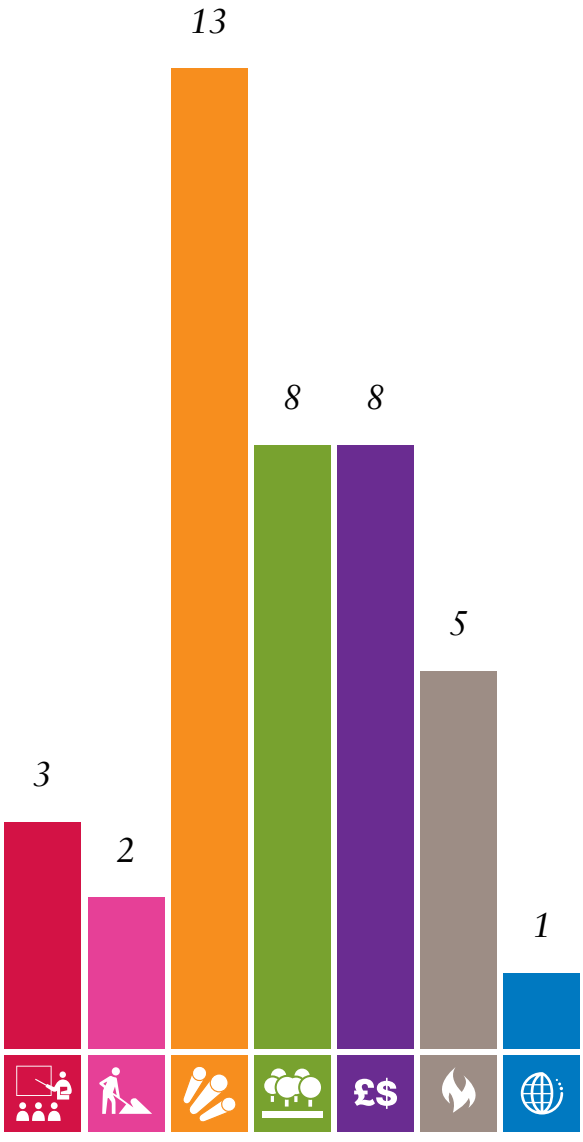
We collaborated on 22 projects across the gas industry

Future network

Facilitate integration of our network into the wider energy chain to ensure least-cost energy provision for our customers.

Future network projects seek to ensure that our network can contribute to the future energy mix, that it is capable of future demands placed upon it and can facilitate the fast-changing pace of innovation in the gas and energy industry. A key project in this area is the Demand Scaling Project, which aims to create a proof-of-concept off-peak demand model for below 7 bar networks and to identify the main peaks in demands.

Figure 1 – Number of projects per innovation area



Significant new learning

Our innovation projects have delivered a number of learning points, which have informed our future projects. We have captured the most significant of our learning to demonstrate some of the successes we have had from our projects.

Cast iron sealant robot (18" cast iron mains)

The main learning point for the CISBOT trial was the proof of concept in using this technology for the first time in 18inch cast iron mains. We have proved that not only can we use CISBOT to seal leaking joints (using Flex Seal rather than Anaerobic) but we can dramatically reduce the number of excavations required for this work. We would be able to reduce 62 individual excavations using traditional methods, to one single excavation.

The trial of CISBOT demonstrated the importance of collaboration with all stakeholders to successfully deliver a project. Working closely with Camden Local Authority (CLA) was critical in planning and executing the trial. We were able to take into consideration any concerns from CLA and demonstrate the substantial benefits on reducing street works, which is particularly challenging in the centre of London.

Partner: ULC Robotics

Iron mains condition assessment

The proof of concept is the main learning outcome of this project. The technology consists of sensors that can, from inside the pipe, accurately detect strain and pipe wall thickness, and determine if internal and external defects are present. A condition assessment system is also included in the scope, to develop our replacement and remediation prioritisation.

Partner: DVS Technologies, Wales & West Utilities (Lead GDN)

Tier one replacement system (TORs)

The main learning point for this project was proving the concept that it is possible to replace a section of gas main and the domestic service connections using just two excavations and the Tier One Replacement System. The collaborative approach from an early stage was a crucial success factor, with frequent and informative communication which ensured that any potential issues were dealt with swiftly and successfully. The supplier had developed a relationship with the key internal stakeholders within our organisation and so was able to interact well and ensure that any questions or queries were answered promptly.

Partner: Synthotech

Alternative jointing techniques for small diameter PE pipes

This project has demonstrated through laboratory testing that it is feasible to trial push fittings used in the water industry on our small diameter PE pipes. This project demonstrates the potential to unlock technologies in other utility sectors such as the water industry and transfer these to the gas industry to develop into appropriate technologies for use on our gas network. This can deliver great financial benefits for our customers and has opened up the possibility for new innovation project streams to identify other potential technologies that could be transferred and trialled for use on our network.

Partner: Macaw Engineering

Asset health and criticality modelling

This project is an excellent example of a collaborative piece of work that has been conducted across all four of the Gas Distribution Networks. The project is working towards delivering a robust reporting methodology for asset health across all gas distribution networks, to allow accurate asset investment decisions to be made. This joint approach is an efficient approach to standardising best practice within the industry and ensuring that the greatest financial benefit to our customers across all networks can be achieved.

Partner: Seams, Enzen, Scotia Gas Networks, Northern as Networks, Wales and West utilities

Collaboration and projects

Collaboration is crucial to the success of innovation. We have worked with a range of partners from our supply chain, other network operators, institutions and bodies to enhance our capabilities, so we can drive successful projects with benefits to our customers.

The collaborative approach to our projects has significantly contributed to their success.
Our close working relationship with key stakeholders has ensured we can realise the greatest benefits for our customers. For example, our close working partnership with the Camden Local Authority when conducting the trial of our Cast Iron Sealant Robot (CISBOT) was critical to the success of the project, allowing us to conduct a trial of a revolutionary piece of technology on a busy street in the heart of London.

As our portfolio of projects demonstrates, many of our projects are being conducted in conjunction with other network operators. This combined effort has given us access to a greater pool of expert knowledge in the industry. This has helped us develop and deliver the most beneficial projects for each of our strategic objectives.

We have forged a partnership with the Energy Innovation Centre, a not-for-profit partnership that seeks to act as a gateway between small and medium enterprises and network operators. Through this partnership, we have developed a number of projects, some of which have been in collaboration with the other Gas Distribution Network Operators.

The development of the web portal by the Energy Networks Association has been a great success, providing a focused channel of communication for the industry. It provides all the relevant information for the projects currently underway with each of the network operators, including National Grid Gas Distribution.

Further information

For further information on our full project portfolio and to see our project progress reports for the projects listed below, please visit the Energy Networks Association Smarter Networks Portal at: **www.smarternetworks.org**

National Grid Gas Distribution projects

NGGD_NIA0001	Optimise Own Energy Use
NIA_NGGD0002	Development of Packaged Solution for Bio-methane Injection
NIA_NGGD0003	Asset Health Modelling
NIA_NGGD0004	MEG Improvements
NIA_NGGD0005	Venting Controllers
NIA_NGGD0006	Sealback II
NIA_NGGD0011	Demand Scaling
NIA_NGGD0012	Alternative Jointing Techniques for Small Diameter PE Pipes
NIA_NGGD0013	CISBOT
NIA_NGGD0015	Seams Analytical Pilot
NIA_NGGD0017	Tier One Replacement System (TORS)
NIA_NGGD0018	Thin Walled PE Liners Stage 2
NIA_NGGD0020	Pressure to Gas
NIA_NGGD0023	MEG Improvements (Stage 2b)
NIA_NGGD0024	Tier One Replacement System (TORS) Stage 3
NIA_NGGD0025	Odour Masking
NIA_NGGD0026	Demand Allocation
NIA_NGGD0027	MRSP Risk Score

National Grid Gas Distribution led collaborative projects

NIA_NGGD0007	Development of DANINT FWACV software for New Gas Chromatograph
NIA_NGGD0008	Internal Stress Corrosion Cracking Assessment (ISCC)
NIA_NGGD0009	Orifice Plate Deformation
NIA_NGGD0010	PE Asset Life Research
NIA_NGGD0014	Cast Iron Fitness For Purpose
NIA_NGGD0022	Study of Crater Information Threshold During Gas Leakage on High Pressure Pipes

National Grid Transmission led projects

NIA_NGGT0023	Development of AGI Safe
NIA_NGGT0003	Pipelines Research Council International (PRCI)
NIA_NGGT0003	European Pipeline Research Group
NIA_NGGT0007	Risk Assessment Methodologies for Pipelines & Installations
NIA_NGGT0047	Resource and Asset Reuse Toolkit

Northern Gas Networks led projects

NIA_NGN00035	Application of Fracture Alert Monitoring

Scotia Gas Networks Led Projects

NIA_SGN0006	Optical Methane Sensing System
NIA_SGN0026	Customer Self Isolatoion
NIA_SGN0023	Cured In Place Pipes

Wales and West Utilities led projects

NIA_WWU007	Pipe Condition Assessment System Phase 3a
NIA_WWU003	Iron Mains Condition Assessment
NIA_WWU005	Development of Standards for Biogas and Biomethane
NIA_WWWU001	Improved Diurnal Storage Requirements
NIA_WWU0006	Asset Health & Criticality
NIA_WWU002	E-Pipe - Trial Internal Lining Assessment & Development of Small Diameter Pipelines
NIA_WWU009	Investment Prioritisation

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