



SGN

Your gas. Our network.



2017/18

**Network Innovation Allowance and
Network Innovation Competition**

Annual Summary

Welcome

Welcome to the Innovation Team's Annual Summary of 2017/18. Innovation is at the core of our business. Through our Network Innovation Allowance and Network Innovation Competition projects, we have been challenging industry orthodoxy by developing new technology and ways of working that will benefit our customers.

“In 2017/18, our project portfolio included over 40 projects funded through the NIA funding mechanism, along with two NIC projects that seek to develop value adding solutions across key business areas. We were also delighted to be awarded two further NIC projects this year, £7.3m for Robotic Roadworks Excavation System (RRES) and £9m for H21.

This year, we have invested £7m on cutting edge innovation projects. Around 30% of these projects were in collaboration with the other Gas Distribution Networks (GDNs).

We are extremely grateful for the commitment and hard work of our project partners throughout the year. It is very satisfying to know we are all working towards a common goal - to add value to our business and our customers.”

Angus McIntosh
Innovation & New Technology Manager, SGN

Our innovation expenditure for this year included £4.1m on NIA projects and £2.9m on two flagship NIC projects

Introduction

About us

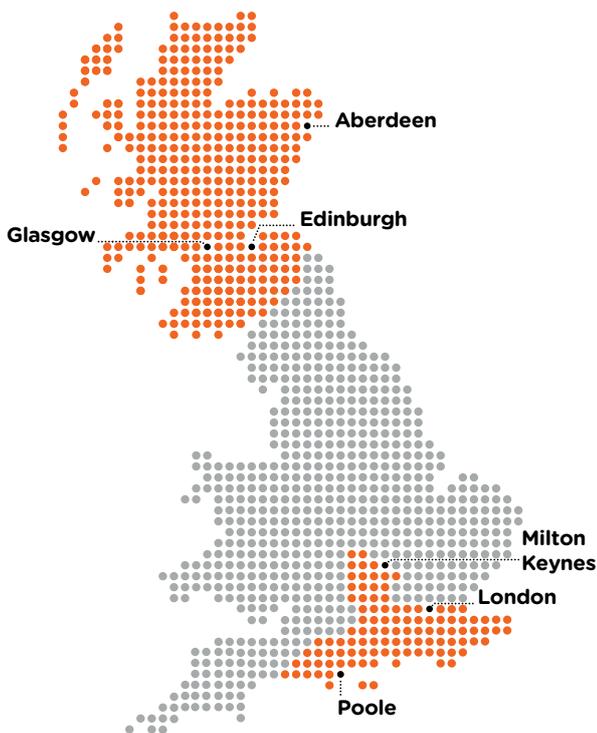
We are one of GB's largest utility companies, distributing natural and green gas safely and reliably through our 74,000km of pipes to 5.9 million homes and businesses across Scotland and southern England.

Our commitment

We are committed to exceeding our stakeholders' expectations by delivering value for money and exceptional customer service as well as providing a safe, secure and sustainable future for our network.

Our vision

Our vision is to keep our customers safe and warm by leading the way in energy delivery.



Key

● SGN network areas

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Innovation strategy

Innovation is not only key to realising our commitment of delivering gas safely, reliably and affordably but also essential in ensuring we are able to successfully address current and future challenges faced by the GB energy industry.

Through our innovation projects, we aim to:

- accommodate new and varying gas sources within our network
- efficiently react to changes in customers' use of gas
- challenge industry orthodoxy
- reduce environmental impact
- minimise disruption to customers
- continue to be cost efficient.

Our innovation strategy is shaped by the feedback we receive from our customers and stakeholders. It is important we consider their concerns in a dynamic and proactive manner.

To develop our Gas Network Innovation Strategy we have collaborated with all Network licencees, through the Energy Networks Association (ENA) and the Gas Innovation and Governance Group (GIGG).

Our strategy identifies the challenges and opportunities the gas distribution and transmission networks face, as GB aims to decarbonise its energy system to meet climate change targets. The strategy sets out key research areas that all gas networks will align their innovation projects against:

1. Future of gas
2. Safety and emergency
3. Reliability and maintenance
4. Repair
5. Distribution mains replacement
6. Environment and low carbon
7. Security



Collaboration

We are working with the other network licencees by sharing ideas, knowledge, projects and problem definitions to ensure the most effective use of NIA funding between networks.

Around 30% of our NIA projects and one NIC project (H21) involve collaboration with other network licencees. We recognise that collaboration is an effective means of disseminating knowledge. However, we use numerous mechanisms for sharing and learning.

We have been involved in a number of collaborative and knowledge sharing events, such as presenting at the annual Low Carbon Networks and Innovation (LCNI) conference. We also engage with stakeholders, third parties and Small and Medium-sized Enterprises (SMEs) to explore how we can create and deliver exciting new innovation projects. Significant project progress and success is regularly shared and presented through the GIGG.



“Cadent believes that the various technologies that SGN has developed can potentially offer an environmentally beneficial alternative to the inspection, repair and replacement processes currently used across the gas industry in Great Britain.”

Huw Sullivan, Innovation Delivery Manager, Cadent

Implementation

We believe that the success of innovation lies in the implementation of technologies, research and learning into Business As Usual (BAU).

All of our projects are designed to deliver clear outcomes which will allow for their integration into our business's processes. Since 2012/13, we have committed investment of over £60m into the rollout of new technology.

We have successfully implemented a number of our NIA projects into BAU this year:

- Robotics
- Wireless Instrumentation
- Magnetic Filtration
- Strategic Pipeline Heat Study
- Microstop
- SIU Gas Quality

Robotics

We have taken an industry leading role in developing and trialling robotic technologies. Following the successful delivery of two flagship Robotic projects, CISBOT and CIRRIS, over £25m has been committed to robotic remediation.

See page 22 for a summary of our Robotic NIC project, CIRRIS.



Wireless Instrumentation Field Trial

The objective of this project was to determine whether wireless instrumentation is a suitable alternative to conventional hard-wired instrumentation for measuring and monitoring pressure reduction, temperature, flow metering, gas quality and other discrete devices on a representative Pressure Reduction Station (PRS).

Our field trial successfully demonstrated the accuracy, functionality and reliability of wireless instrumentation systems for measuring and monitoring purposes.

Wireless systems were proven to deliver significant benefits including reductions in excavation, reinstatement and design requirements as well as lowering labour and maintenance costs. It is considered the preferred method of installation for both new installations and retrofit to existing sites.

Following the success of the wireless field trials, a complete conversion of an existing hard-wired telemetry system to wireless instrumentation was installed at Hastings PRS.

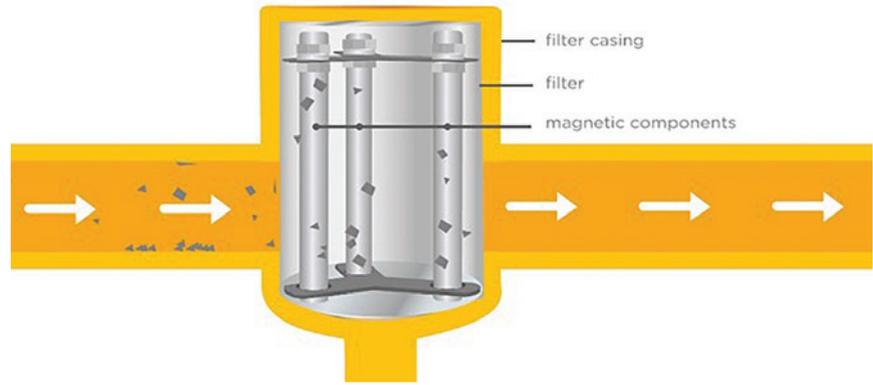


Magnetic Filtration

The GB gas network has a number of low pressure pipeline systems that suffer with mains dust problems, largely due to corrosion and abrasion from within the pipeline. If there is a continued occurrence of mains dust, this can result in loss of supply from key asset infrastructure that regulates the pressure tiers in our network.

The Bournemouth and Poole area is a large integrated low pressure network, where high volumes of mains dust has been collected during winter months. The inlet filter elements were becoming blocked at peak demands, thus reducing the output. This required regular site visits to exchange the filter elements to sustain a desired outlet pressure.

We have now procured these filters and they have



successfully been installed at areas of our network which suffer with mains dust. In addition, the magnetic filters have been installed on a 19bar PRS to capture an increase in welding shavings.

These magnetic filters are able to deliver better performance than a conventional filtration system, returning the systems to their full operating parameters, while reducing maintenance frequency and costs.



Strategic Pipeline Heat Study

Many of our sites have preheating systems installed to manage the Joule-Thomson effect from pressure reduction. We record a considerable number of alarms and faults associated with preheating control systems. If we can optimise our control systems, we hope to be able to eliminate unnecessary callouts and increase reliability and efficiency of these systems.

Corrosion has been identified at our above ground asset sites, where a number of these were identified under insulation lagging. To understand if lagging is required, it is necessary to monitor the heat loss associated with the site.

The sites selected for the project provide a variety in heating systems, locations, pressure cuts, above/below ground pipework etc. making them a representative sample of our Network's assets. The analysis carried out on each site includes a full site survey, installation of temporary temperature sensors, data analysis, engineering toolbox development and a review of maintenance histories. This information has been gathered and developed into a decision support tool to

determine whether insulation is cost effective when compared to the risks associated with corrosion and associated costs in removing insulation for periodic inspections.

The project has determined how to optimise our alarm, control and operating philosophies to increase energy efficiency, reduce unnecessary call outs and in the majority of cases, eliminate the requirement for lagging. The analysis is now being applied to sites across the network and being used to identify how we can optimise our network.



Microstop

For multi occupancy buildings, the below ground section of steel risers is most prone to degradation and corrosion and presents the greatest risk to people and property. Often, if the network riser is installed internally in a multi occupancy building, it is not subjected to the same corrosive environment compared to external risers. As such, most above ground pipework can be retained when carrying out replacement activities.

This project has developed an alternative means of live network riser transfer. The Microstop System is capable of isolating and bypassing sections of riser pipework, while enabling the supply of gas to remain unaffected during maintenance and replacement operations.

Around 40 trials were completed during this project, proving the suitability of the tooling and materials following comprehensive offsite risk assessment, design and testing.



Several different operation types have been completed using Microstop, these include:

- Renewal of below ground steel section while maintaining gas to the riser
- Renewal of individual laterals
- Removal of laterals or uncommon material e.g. copper
- Disconnection of unused laterals and installation of lateral valves

All were successfully carried out across the range of diameters 1", 1 ¼", 1 ½" and 2".

Our operatives have not only seen an improvement in productivity and reduction in costs in comparison to conventional techniques, but also an improvement in timescales, customer satisfaction scores and connections lead times due to avoided interruption. Network riser repair and replacement is a high volume work activity and since the end of the project, we have completed more than 30 partial riser replacements.



SIU Gas Quality

The Opening up of the Gas Market (OGM) NIC project successfully demonstrated the capability of using rich Wobbe Index (WI) gas within our network. This project proved that gas that meets the European Association for Streamlining of Energy Exchange (EASEE) gas specification, but sits outside of the characteristics specified within the Gas Safety (Management) Regulations

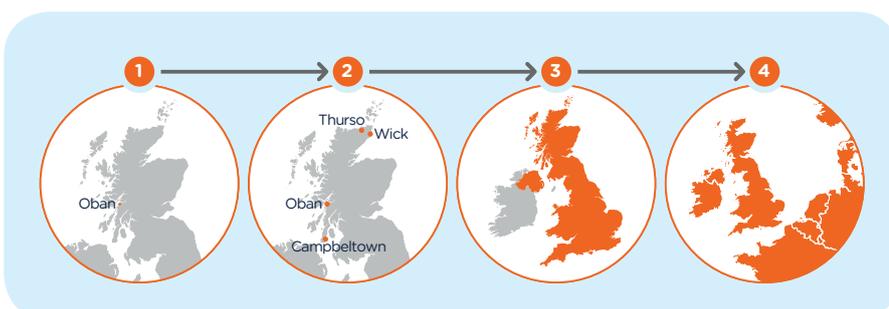
(GS(M)R), can be distributed and utilised safely and efficiently within GB. Following comprehensive testing and inspection of different WI gas through the OGM project, an exemption was granted by the Health and Safety Executive (HSE) in 2014 to allow SGN to introduce and supply rich WI gas into the Oban network.

Following the success of the OGM project, our Scottish

Independent Undertakings (SIU) Gas Quality project, carried out as BAU, sought to extend the changes to the other three mainland SIU sites (Campbeltown, Thurso and Wick).

This work is highly relevant both in GB and internationally, and reports on SGN's findings have been published.

This year, we were successfully granted a further extension up to 2020 from GS(M)R. We continue to support efforts to roll out this innovation into GB through the Institute of Gas Engineers and Managers (IGEM) Gas Quality Standard Working Group.



Our project partners

We have established excellent working relationships with SMEs in GB (84% SME and 16% Non-SME), as well as multinational organisations based in Europe and North America, yet we continue to engage and expand the diversity of partners we work with.



“With the continued support of SGN, we are looking forward to Photonfix being used in the field to improve the integrity and life of the GB Gas Distribution Network.”

Nick Ryan, Director, Steer Energy Solutions

“SGN’s consistent customer-first philosophy, combined with safety, project innovation and their timely responses to all technical matters have significantly helped our equipment design approach in delivering practical solutions.”

Billie Turner, Project Manager, TRACTO-TECHNIK UK LTD



“SGN is really pushing for innovative approaches to further understand and manage risk in the networks. With the Innovation team bringing together both Network Strategy, Business and Operational staff during Project Hypercube, we really got a deep understanding of Gas in Buildings events.”

Roger Badenhorst, Manager, Bearing Point

Network Innovation Allowance

Ofgem's NIA funding mechanism allows network operators to develop new and exciting innovation projects that promote safety, security and efficiency within our industry. The following section outlines the projects that were ongoing and started by SGN during the period 1st April 2017 to 31st March 2018. We have also included project snapshots to provide further insight into some of our existing projects.

Available budget spend for all NIA projects is set at 0.5% of our revenue for RIIO-GD1. Since 2013 we have invested over £28m (2017/18 prices) overall on our NIA portfolio.



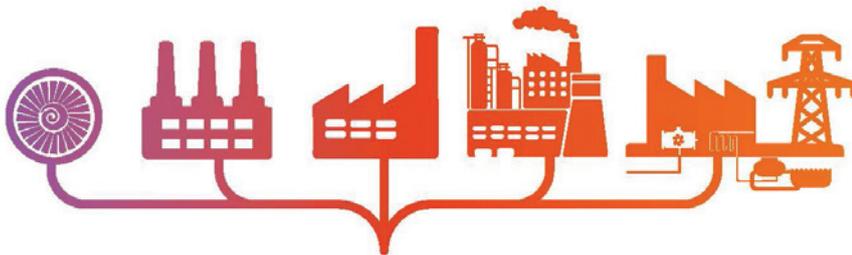
Future of gas

We believe gas has a role to play beyond 2050 and we are working hard to take the carbon element out of gas to demonstrate it has a long-term future as part of a sustainable energy mix.

Our future of gas projects are focused on the introduction of new and renewable gas sources to open up the gas market, drive down the cost of gas and promote alternative low carbon solutions to meet the needs of our customers for years to come.

SGN's involvement in future gas projects include:

- IGEM Gas Quality Standard Working Group
- Gas Quality Impacts on Industrial and Commercial applications
- LTS Demand Forecasting Tool Scoping Study (Phase 1)



INDUSTRIAL AND COMMERCIAL GAS QUALITY

Gas Quality Impacts on Industrial and Commercial applications

The gas industry is facing its greatest challenge since the introduction of natural gas in the 1960s, with new types and sources of gas, and the need to reduce carbon emissions by 2050. Gas quality will play a crucial role in the future of energy in GB as new sources of gas become available. However, to ensure the networks can realise the benefits associated with these changes, we must first understand the potential impacts.

This project, building on the success of SGN's NIC project, Opening up the Gas Market and the SIU Gas Quality project, aims to explore the effects of a wider gas range (specifically relating to WI) on industrial and commercial gas consumers. The scope of the project includes investigating blended hydrogen mixtures (up to 20% H₂). Furthermore, the project will provide a review on the effects of the rate of change of WI and how this will impact network modelling.

Stakeholder engagement is fundamental to the success of this project, therefore, with the support of IGEM's Gas Quality Working Group, industry experts and other contacts from across the whole gas supply chain are providing input into this study.

Safety and emergency

Safety is at the heart of everything we do, whether it's the safety of our customers, the general public, our employees or contractors.

Emergency operations are a high cost area with a significant impact on customers. We provide 24/7 gas emergency services to ensure safety to our customers and protect property and assets. Innovation is involved in helping improve efficiency and ensure safety for our operational teams and contractors through a number of innovation projects.

We have a number of innovation projects that focus on key areas of safety and emergency:

- Stent Bag
- Advanced Gas Detection
- Remote Site Monitoring Device
- High Volume Gas Escapes (Stage 1)
- Hypercube



4" cast iron pipe showing damage

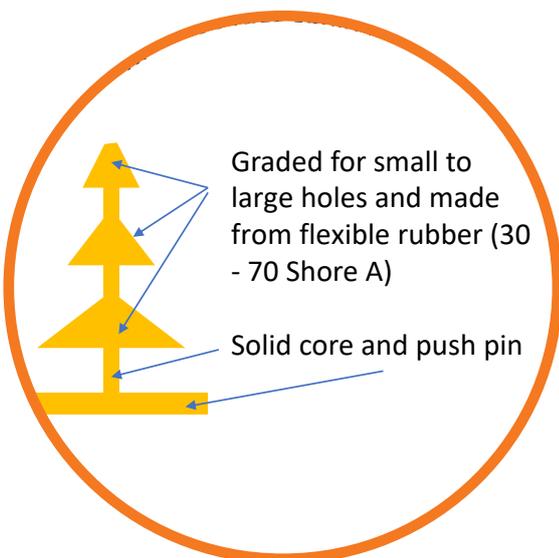
High Volume Gas Escapes (Stage 1)

High volume gas escapes, although uncommon, pose a risk to individuals and infrastructure in their vicinity. Depending on the situation and location, maintaining the gas escape can be difficult where minimum contact and interaction is advised to ensure safety to Gas Operatives and customers. This is because gas in a confined area (e.g. in the pit) elevates the likelihood and consequences of an explosion.

Gas escapes also have the potential to significantly disrupt supply to customers. In effect, there are three issues that are addressed within this project:

- Mitigating the consequences of the loss of gas
- Ensuring continuation of supply to customers
- Removing risk of explosion, for example to the public and contractors

This project aims to identify and develop a number of prototypes and techniques for high volume escapes from pipelines operating up to 7bar (excluding those within buildings). These techniques can be selected based on the type of gas escape.



Reliability and maintenance

Several of the projects within this theme aim to radically change the way that we currently undertake specific activities and operational techniques, as well as introducing new innovative solutions that may extend the life of our ageing assets.

- Starline/Marwin Valve Bolt Replacement
- Magnetic Filtration in Medium to Low Pressure Networks
- Smart Paints and Coating Systems
- Corrosion Mapping System for Buried Orpheus Regulator Modules – Phase 2
- Automated Regulator Maintenance (ARM) (Phase 1)
- Pit Protect
- Small Diameter PE Flowstop
- Oxford Flow Optimised Pressure Reducing Station
- Strategic Pipeline Heat Study
- Bolt Integrity
- Universal Temperature Controller using Artificial Intelligence
- ACE (Advanced Condensing Exchanger)

Bolt Integrity

Bolts, although small, play a very important role in the integrity of our network.

We are partnering with a company called Hydratight to remove and test bolts to determine the remaining strength in the bolt. Hydratight will complete live field trials using the reinforcement clamp for bolt replacement of four bolt flanges. They will also develop a screening tool to determine the remaining strength/life of the bolt.

Currently, the visible part of the bolt is inspected visually and the bolt is categorised based on the level of corrosion (e.g. severely corroded, significant corrosion, slight corrosion, surface corrosion or no corrosion). This type of inspection measurement cannot be quantifiable and can be inconsistently applied during inspections. We aim to quantify the corrosion as a percentage of metal loss or cross-sectional area and understand how the corrosion affects the remnant strength and life in the bolt. The results from this project will be scalable to determine bolt integrity work into the next price control (GD2).



Repair

One of the key challenges we face as an industry is the safe management of ageing assets.

Our repair projects look to enhance the way we repair our maturing infrastructure while ensuring the highest standards of safety with minimal disruption to customers and the general public.

- Gas Polymerisation – Stage 2 - Engineering Development
- Self-Amalgamating Tape (Stage 3)
- PhotonFix™ (Seeker Particles - Stage 3)
- Advanced Mini Bag Kit
- Robotic Roadworks System (RRS) - Stage 2

PhotonFix™ (Seeker Particles - Stage 3)

From the 1850s up until the 1950s cast iron mains were used extensively across the GB gas distribution network. Although the GB gas industry has moved away from this material, there is a significant portion of cast iron still in use today. SGN has thousands of kilometres of metallic mains that require regular inspection, repair or even replacement.

Extensive investigation has demonstrated that the majority of larger diameter pipes are less likely to fail through cracks and fractures, but instead are more likely to leak from the existing joints and other features such as cotter plates, redundant service connections, dome plugs and riser leaks.

This project (Stage 3) has focused on laboratory based testing of the process (investigated in Stage 1 and Stage 2) of applying sealants to joints, holes and other pipeline features from inside the gas mains, eliminating the need to drill into the pipe.

The sealant flows into the joint which quickly forms a barrier seal enabling injection to continue until the joint is completely filled. Stage 3 is in the final stages which has provided a one trip, no dig, no drill sealing system capable of being applied internally within the pipe using robotic technology.



Mains replacement

Our distribution mains replacement projects are designed to provide safe, efficient and cost-effective ways to carry out our high volume activity, as well as minimise disruption to road users and local businesses.

Our versatile new technologies have the potential to deliver benefits for the gas distribution industry, the wider utilities industry, our customers and the public.

- Microstop
- Bond and Bolt Saddle System
- Olympic Rings for RIIO
- Core Drilling and Flow Stop, WASK
- Mains and Service Replacement through Keyhole (iCore)
- GasLight Q field portable nondestructive PE material analyzer
- SynthoScope
- Automated Pressure Tester
- Cured In-Place Pipe (CIPP) (Stage 3)
- Ironclad (Component Prototype Phase - Graphitisation Stage 2)
- Forged Carbon Fiber Products (FCFP) - Stage 1
- Under Pressure Drilling Equipment for PE Construction Valves

Mains and Service Replacement through Keyhole (iCore)



We are committed to developing innovative new techniques that will benefit our business and our customers. A key concern for our customers and our stakeholders is the disruption caused by our streetworks. Therefore, innovation in this area has been a particular focus for the gas network and other utility companies.

The aim of the Mains and Service Replacement through Keyhole project, more commonly known as iCore, is to develop new techniques, products and methods that reduce or eliminate the requirement for excavation, significant operational foot print, multi-stage reinstatement, complex traffic management and minimise disruption to our customers, while maintaining safety and efficiency.

This project involves detailed technical assessments, designs, development and field trials of keyhole tooling methods and equipment for mains and service replacement activities. This will demonstrate the ability of the tooling

and equipment to reduce traffic congestion, overall excavation foot print, operational times and general inconvenience to customers and road users.

We have developed tools and equipment in partnership with TRACTO-TECHNIK to significantly extend the range of distribution network operations that can be undertaken in keyhole excavations.

This project is concentrating on network improvements including insertion of PE in iron mains, trenchless insertion of PE services, and making service connections to facilitate our significant mains replacement programme.

We are widening the capability of keyhole operations through several projects, and are investing in ambitious innovative technology including robotics to aid in minimising the size of streetworks activities.



Core • Drill • Connect

Environment and low carbon

The UK has committed to meeting the target of an 80% reduction in carbon emissions by 2050.

Although this looks to be a challenging target, there are a number of innovation projects being developed by the GDNs to help achieve this target. The gas network will be fundamental to meeting this challenge as the energy system moves to a low-carbon future.

100% Hydrogen

The introduction of distributed hydrogen into the energy mix has the potential to play a major role in the UK's journey towards decarbonisation, and in doing so achieving the government's 2050 carbon reduction target. Our Hydrogen 100 feasibility study will, through research and evaluation, assemble the evidence base required to support the building of the safety case, construction of the network and demonstration of safe operation. Customer acceptance is key to the success of the project, therefore building the evidence case for safe distribution, and for demonstrating that hydrogen carries no greater risk than natural gas is essential. Our customer engagement road map below illustrates our plan for achieving customer acceptance.

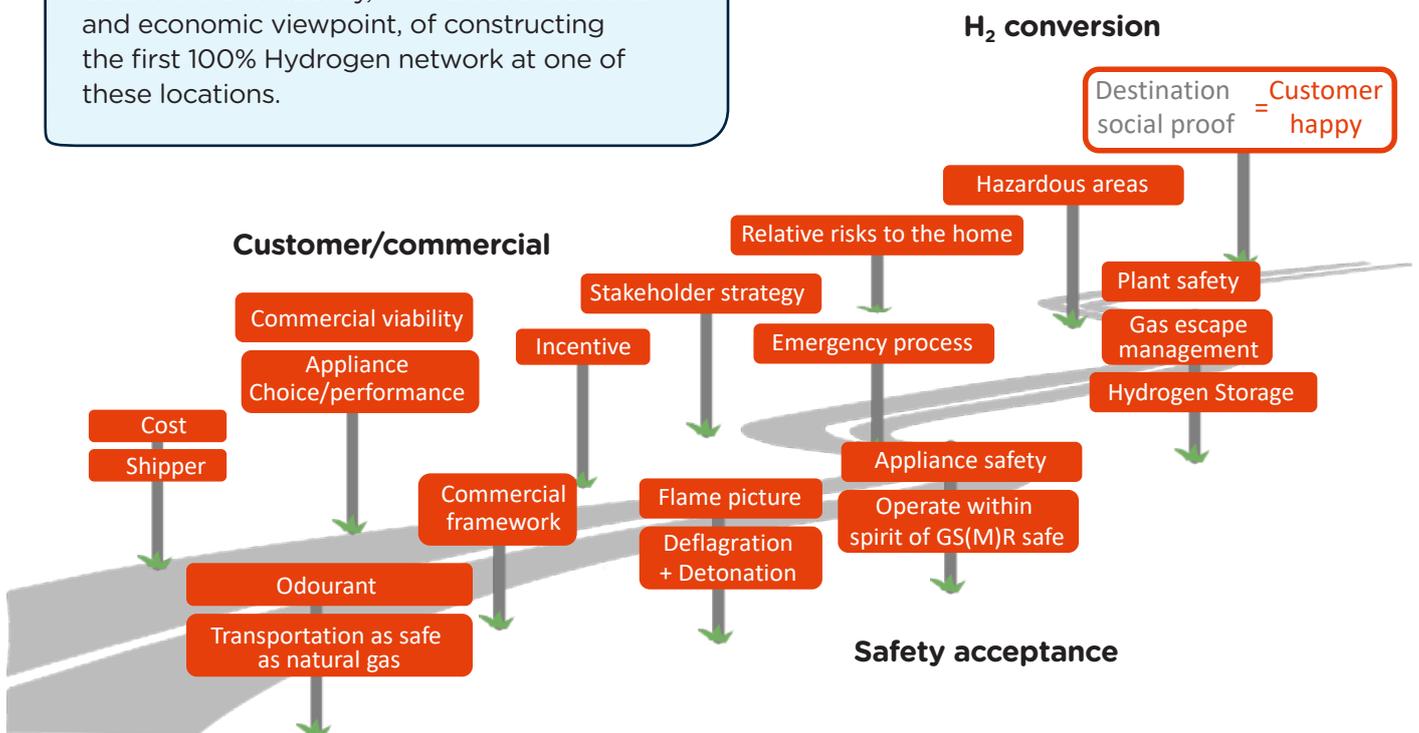
Phase 1 of the project has three elements: Feasibility, Front End Engineering Design (FEED) and Development of the Safety Case. The Feasibility and FEED studies will be conducted at three sites in Scotland. These will determine the viability, from both a technical and economic viewpoint, of constructing the first 100% Hydrogen network at one of these locations.



The Safety Case element will evaluate existing processes and procedures and gather evidence in support of the production of an HSE approved safety case.

Phase 2 will construct and field trial the operation of the new PE network. This phase will run for 3-5 years and will demonstrate hydrogen distribution is safe when using modern materials and jointing techniques.

This is essential before the conversion of an aged and mixed material network is undertaken.





Network Innovation Competition (NIC)

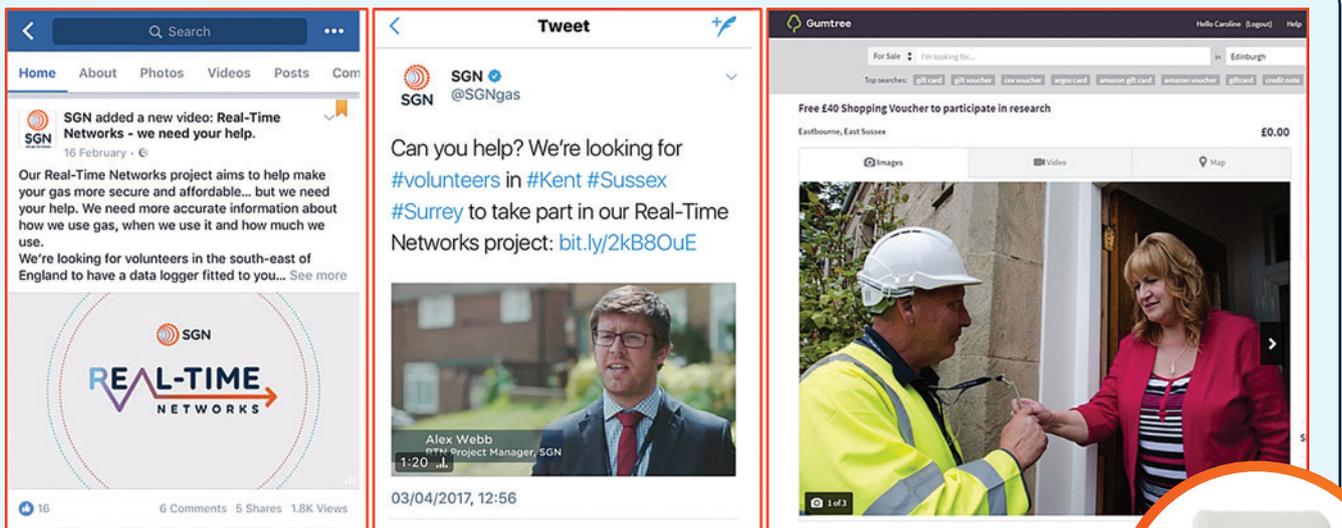
Ofgem's NIC is another stimulus mechanism to promote more substantial innovation projects within our industry and is worth £20m.

Real-Time Networks

Our £8m NIC funded project, Real-Time Networks, aims to demonstrate a flexible gas network that can react to current and future changes, whether at network or consumer level. For this, we are gathering real-time data which feeds into our newly developed Cloud Data-Solution to facilitate real-time modelling, analysis and advanced forecasting.

We invited domestic customers through promotional outlets, such as social media, letters and home consultations, to volunteer their personal consumption data. This achieved interest from thousands of customers from which 600 participants were chosen.

We have installed 1,200 meter loggers to collect demand data from a statistically representative sample of consumers.



600 industrial and commercial customers from local universities and schools, to restaurants and shops also offered their gas consumption data.



Changes in demand, affected by regional climatic variations, will also be incorporated into the model. We have installed weather instrumentation, including sensors for temperature, humidity and wind speed, at five PRS sites across our south-east trial zone. We captured peak demand data during the 'Beast from the East', providing further understanding on how our customers use their energy.



We have completed civil works at three out of six sensor technology sites that will collect gas quality, flow and temperature data. Various challenges have been encountered at each site and a dynamic design process has allowed changes to be accommodated. Commissioning of the sites will be completed in time for the winter 2018 peak demand period.

Installation of Abriox Osprey Pressure Validators (previously developed under the NIA and implemented in 2012) have been installed to record pressure data at 30 key points along the network.



Our research on the impact of downstream renewable technology on network capacity and management has also reached its final phase, and is imperative to the real-time model.

We are continuing the software development in relation to the demand modelling and its algorithms will be validated when the sensors begin collecting real-time data.

Robotic Roadworks and Excavation System (RRES)

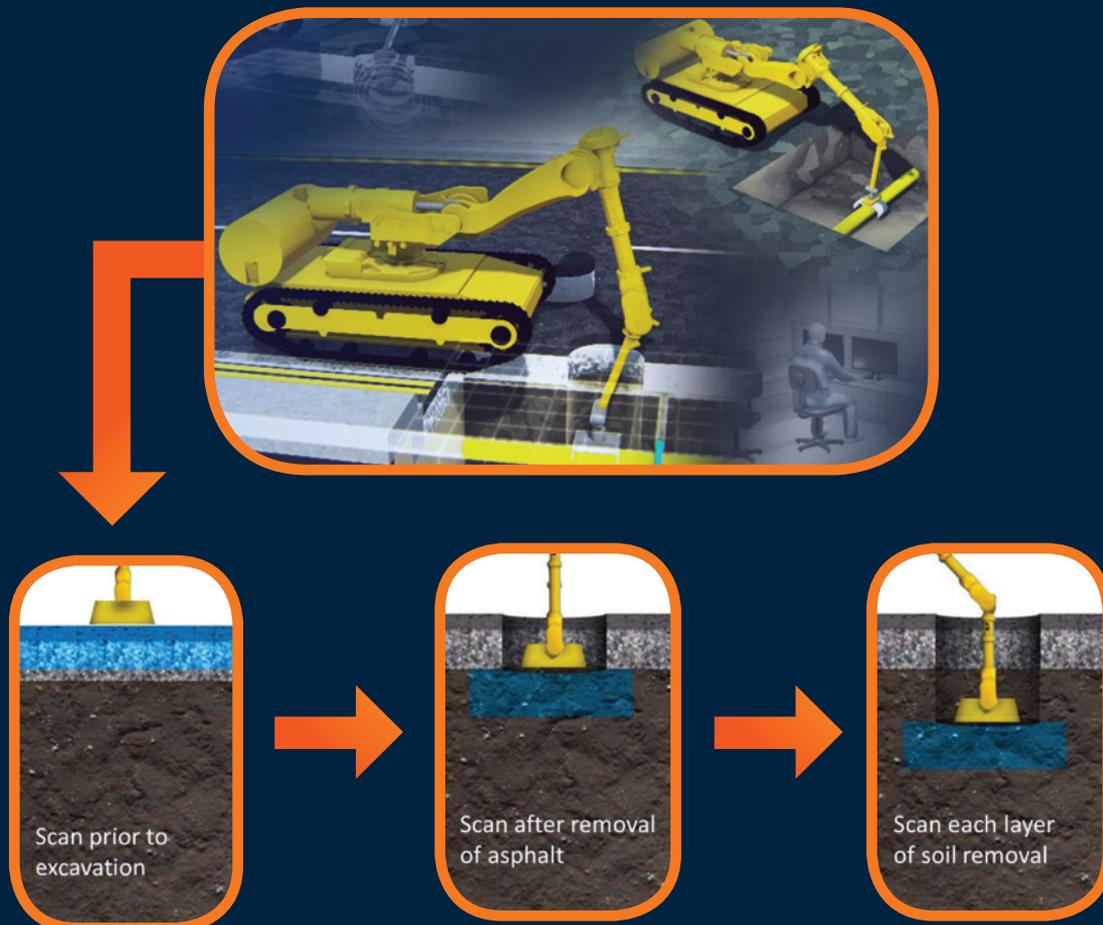
In 2018, our submission was accepted to fund our fourth NIC project of £7.3m to develop a Robotic Roadworks and Excavation System.

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

RRES addresses three main problems of gas utility excavations:

- Labour intensive operations that have high financial and environmental costs due to the resources, vehicles, plant and control measures required
- Traffic disruption and significant CO₂ emissions created by large and heavy equipment
- Risk of damaging unknown third-party utility infrastructure using conventional excavation techniques, which can lead to loss of supplies, disruption to customers and significant risk of injury to operatives.

The project will automate the excavation process in both rural (transmission) and urban (distribution) areas using artificial intelligence and advanced robotics. Using below-ground locating sensors, computer vision and 'soft-touch' excavation tools will prevent the damage of neighbouring utilities and of the target asset.



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 (UAF) on the pipe that facilitates a variety of gas main inspection and repair operations through one reusable fitting. The RRES will backfill, perform tamping to specification and reinstall the original road surface.

RRES has a range of benefits which include:

- Higher repeatability; reduced operating costs
- Lower risk of damaging buried assets
- Reduction in carbon footprint
- Reduction in site footprint and less disruption to the public
- Lower risk to operatives by removing them from the immediate excavation area
- Reduction in excavated material to landfill through reinstatement using the original road surface
- Open market for expanding future inspection, maintenance and repair operations
- Development and implementation of new intellectual property on behalf of the GB gas consumer
- Applicability to both gas transmission and distribution assets
- Transferability to other utility and infrastructure sectors.



Robotics

Our recently completed Robotics project has demonstrated a safer, more cost-effective and environmentally beneficial alternative to the inspection, repair and replacement processes currently used in GB's gas industry.

During this project, we designed, developed and carried out a field trial of a robotic system, aimed to reduce the excavation and restoration requirement for operational and maintenance works. This minimises disruption to our customers, the public, and reduces our costs and carbon footprint.

As part of Robotics, we produced and demonstrated the use of:

1. The Launch and Transport Platform, created to facilitate safe launch of the robot into a live gas main and permit manoeuvrability of the robot when travelling through the main.
2. CIRRIIS XR (Repair), which proved to be capable of internally sealing mechanical joints and repairing failed Weco Seals.
3. CIRRIIS XI (Inspection) which used specialised sensors to assess wall thickness and measure stress and strain of the main to establish the health of the pipeline.

4. The Service Line and Measurement Robot System, which is critical to the live insertion of the service line with PE pipe, remotely reconnects the service lines to inserted pipe without the need to perform excavation over each of the connection points, which reduces costs of resources, perimeter and restoration.

With the introduction of new robotic system and technologies, Robotics successfully demonstrated our ability to safely operate inside live gas networks and diminished the need for multiple excavations. The project proved that up to 100 joints can be repaired with having only to perform one single excavation. It was the first time a mechanical joint had been robotically sealed in the UK and pioneered the reconnection of the service line to the main, using an internal robotic system.

This ground-breaking project will contribute to an improved risk management framework and understanding of the asset life-cycle and ensuring GB gas network companies can play a role in the future low carbon gas system, efficiently and economically.

Next steps

This year, we have successfully implemented a number of innovation projects to help optimise performance in the GB GDN.

Our focus over the next year is to continue building on this success by meeting and exceeding the following goals:

Efficiency:

We aim to develop new products, techniques and ways of working that improve the efficiency of what we do and add value to our customers.

Future of gas:

We aim to examine the role of gas and the gas networks in the future energy system, alongside an analysis of alternative scenarios.

New partnerships:

We will build new working partnerships to drive innovation across the industry.

Implementation:

We will continue to successfully implement valuable projects.

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If you smell gas or are worried about gas safety, you can call the National Gas Emergency Number on **0800 111 999**

Carbon monoxide (CO) can kill.
For more information:
www.sgn.co.uk/safety/carbon-monoxide