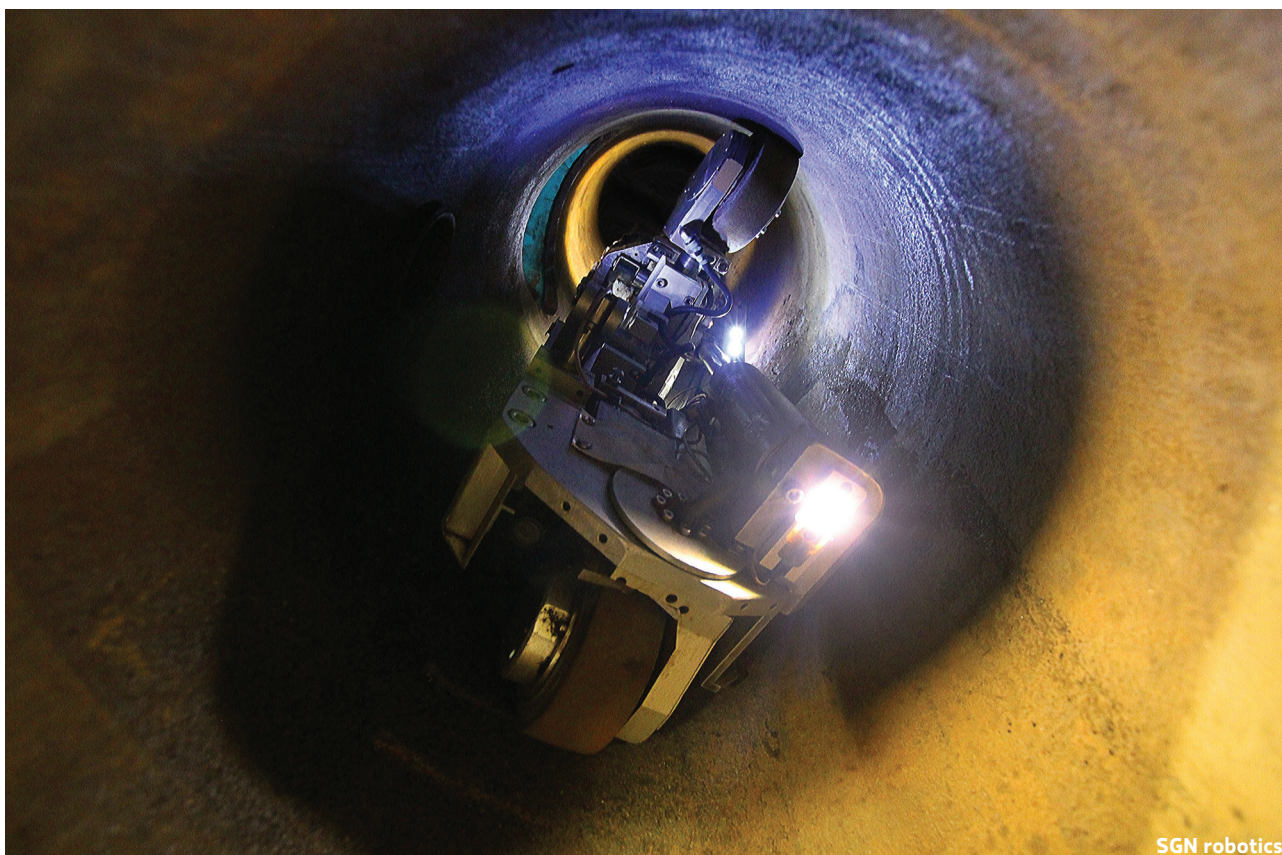


# COLLABORATING FOR A SUCCESSFUL GAS FUTURE



SGN robotics

**The past year has been an exciting time in gas innovation, with the 2016 Low Carbon Networks and Innovation (LCNI) Conference in Manchester, the launch of the Gas Innovation Problem Statements and the first ever IGEM Industrial Affiliates Innovation event. Matt Hindle, Head of Gas at the Energy Networks Association (ENA), reflects on the past year's success stories and looks at some of the exciting developments we can look forward to over the next six months**

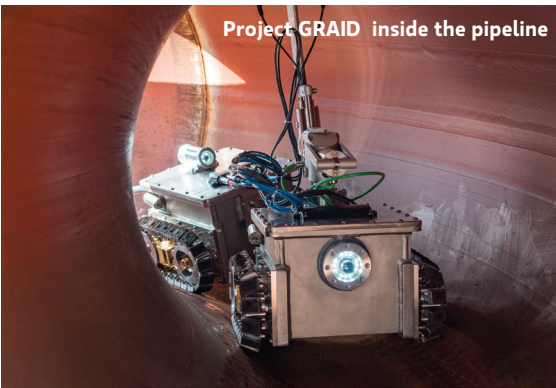
In November last year, each of the gas networks (National Grid Gas Transmission, Wales & West Utilities, Northern Gas Networks, SGN and Cadent) showcased their latest cutting edge innovation projects at the LCNI conference in Manchester.

The conference offered an opportunity for delegates to meet the teams behind their innovation projects and to get a first-hand look at the tools and technologies under development. A range of focused sessions on key topics, including asset management, street works and

robotics, provided an opportunity to understand the development of these projects and discuss the future challenges we need to tackle.

Following on from the success of the LCNI 2016, the focus remained firmly on how we could improve collaboration across the gas industry and be more accessible to prospective partners. Through our interactions at LCNI, as well as other forums, events and informal discussions we were told that articulating the problems we are trying to solve is key. As a result, we collaborated across the gas networks to produce the Gas Network Innovation Problem Statements in March 2017.

Continuing our drive to reach new prospective partners and aid discussion across the industry, we held



the first Innovation Day in partnership with IGEM Industrial Affiliates in June. This day was a great success, providing IGEM IA members with the opportunity to learn more about the opportunities the innovation funding mechanisms offer, the current live projects and ways they could get involved with the key challenges facing the networks. An afternoon of innovation ‘speed dating’ also proved very successful, facilitating further discussion on potential innovation.

Building on these problem statements, the focus remains on increasing collaboration across the gas industry. The ENA has appointed DNV GL as independent consultants to begin delivering a joint gas innovation strategy for the gas networks. The purpose of the strategy is to ensure that there is a joined-up approach to innovation, with coordinated action on priority issues that offer significant potential benefit and shared learning, while minimising unnecessary duplication. The strategy is due to be submitted to Ofgem in March 2018. A key milestone in its development will be the stakeholder consultation which is currently live, running until the end of December, with a feature session at the LCNI conference to update on progress.

The LCNI is a platform for networks, suppliers and stakeholders to share the latest breakthroughs in innovation

– and discuss how the industry can best tackle the challenges ahead. Sharing new technology and effective ways of working, and collaborating with colleagues across the gas industry means the potential of innovation is optimised.

This year’s conference sees more innovation projects than ever being showcased, so let’s take a look at some of them here.

### **NATIONAL GRID GAS TRANSMISSION PROJECT GRAID**

Project GRAID (Gas Robotic Agile Inspection Device) is a new type of robot capable of inspecting the condition of buried pipework at high-pressure gas installations (AGIs) from the inside. The quality of the data it will provide, once complete, will allow us to manage, maintain and replace these assets more efficiently. Progress this year has included the development of an offline test rig, which has been designed and developed for use in offline trials, at RAF Spadeadam in Cumbria, recreating the conditions of an AGI site.

### **ART**

The acoustic resonance technology (ART) project is providing a new technique for carrying out inline inspections, which play an important role in the ongoing maintenance of gas transmission pipelines. Conventional techniques are based on magnetic flux leakage (MFL) technology. While the technique is highly developed and understood, it doesn’t directly measure how thick the walls are, which is a key reading for assessing the magnitude of defects. ART uses ultrasonic techniques to accurately locate and measure any defects it identifies on a pipe, potentially providing much more precise information.

### **PROJECT CLOCC**

Through Project CLoCC (Customer Low Cost Connections), NGGT is simplifying the process of connecting to the national transmission system (NTS) for a new generation of gas customers. Recent developments include a suite of innovative new connection designs and to help customers choose the connection option that’s best for them. In less than 60 seconds, after entering basic details about their project such as location and predicted gas flow, the portal will provide a high-level indication of how much a connection will cost, the capacity available and advice on the right connection design and size. We have also developed conceptual designs for a comprehensive suite of CLoCC connections.

### **AI FOR PIPELINE COATING**

NGGT is applying the latest ideas in artificial intelligence (AI), to improve how it conducts inspections on above ground assets. This new technology will make categorisation of corrosion more consistent and aid smarter investment decision-making. Using the latest machine learning technology, NGGT is training an algorithm to recognise the different equipment types and categories of corrosion found on the network. This is done using a library of tens of thousands of photographs along with knowledge gathered from technicians and engineers. Using AI in this way will improve our data collection and standardise how corrosion condition is categorised.

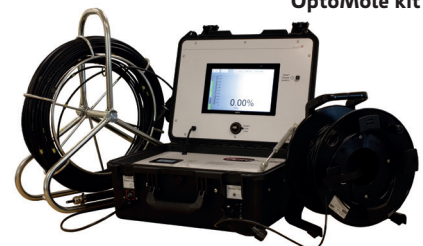
### **CADENT**

Cadent will be showcasing new technology supporting day to day repairs, mains replacement and bringing to life its vision for the future role of gas.

### **OPTOMOLE**

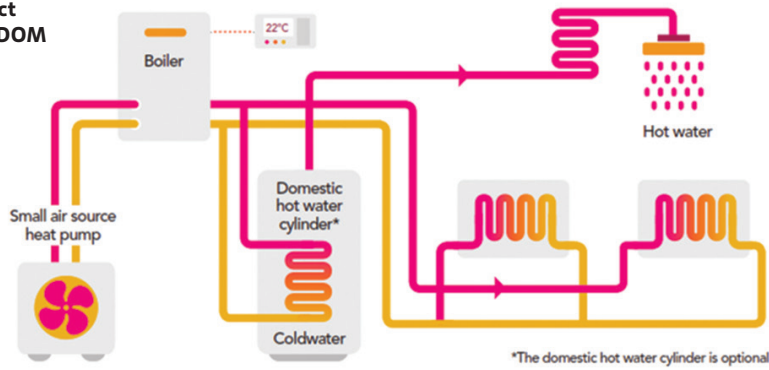
Optomole is a mobile, optical methane sensing system which is now being trialled on the Cadent network. Optomole allows repair teams to locate gas leaks in buried service ducts quickly, accurately and safely.

**OptoMole kit**



“ A range of focused sessions on key topics including asset management, street works and robotics provided an opportunity to understand the development of these projects and discuss the future challenges we need to tackle

**Project FREEDOM**



It builds on existing optical detection technology from Cadent's innovation partner, OptoSci.

**BONDED SADDLE**

Finding simple applications to reduce excavations for mains replacement work has seen the Cadent innovation team explore new ideas this year. Bonded Saddle is a new device which gives quicker and easier access to large diameter (18in+) pipes. The saddle builds on the ALH 'bond and bolt' technique, delivering a bond-only system for a drilling saddle attachment for temporary mains access. When the saddle is in place, operatives can drill, tap and install new fittings, and remove existing fittings. Longer term, there is potential to expand its use across other areas such as smaller diameter pipe connections.

**HYDROGEN CLUSTERS**

Cadent will also be sharing information about its future role of gas projects, including an ambitious scheme for a hydrogen cluster in Liverpool and Manchester. This conceptual study explains how hydrogen could be used in place of natural gas to power industry in the region. Excess hydrogen could then be blended with natural gas to heat homes and businesses across the area.

**WALES & WEST UTILITIES FREEDOM**

Freedom is a £5.2 million industry

first; a cross-sector collaboration project involving the installation of 75 hybrid heating systems in residential properties in Bridgend, South Wales. Working alongside electricity DNO Western Power Distribution (WPD) and other collaboration partners, the project will simulate a roll-out of hybrid heating systems in a demand side response market to demonstrate and articulate the potential consumer cost, carbon emissions and energy system security benefits from the large scale deployment of hybrid heating systems, learning how best to balance the interests of the consumer, supplier and network operators.

**SMART PRESSURE SENSOR**

A new pressure sensor developed alongside WWU is now available to the UK industry from project partner Steve Vick International. Known as the SMARTester, it gives an enhanced level of testing to overcome and reduce the risk of inaccurate readings. It connects to a smartphone app via Bluetooth technology to transmit live data to your records system.

**FLEXIBLE ENERGY SIMULATOR**

Our unique energy simulator models future energy supply and demand,



making sure that policy-making is evidence-based to deliver affordable and sustainable energy for future generations. The model allows government, utilities and local authorities to plan and deliver on strategic opportunities to help the UK meet the challenges of the energy trilemma and bring benefits to a range of stakeholders. Our simulator has been adopted by organisations outside of the gas industry, such as the Institute of Welsh Affairs, to support their energy research projects, demonstrating its novel capability and impact.

**DRONES**

WWU is taking film and photography to new heights. Drones have been heralded as the next big thing in delivery services and now they are set to help gas networks survey their pipelines and work faster, easier and cheaper than ever before.

**NORTHERN GAS NETWORKS SYSTEM TWO ASSESS AND SEAL PROJECT (STASS)**

NGN has 1,700km of Tier 2 and 3 assets, meaning repair or assessment projects can be extensive. There are three key drivers for intervention in relation to these assets: leakage, proactive risk management, confirmation of as laid data. NGN is looking to address these drivers to improve how it can proactively manage its Tier 2b and 3 assets. STASS aims to bring together a 'best of breed' within existing proven technology, evolving these to provide a cost-effective solution which will allow NGN to use robotic technology under live gas conditions. The project will address keyhole access, the robotic visual inspection of assets, methods to identify and map key features and techniques for seal joints.

**H21**

NGN will be sharing the next steps for the H21 project which are currently underway; these will be in the form of the four network innovation allowance (NIA)

projects:

- H21 – Alternative hydrogen production and network storage technologies
- H21 – Keighley and Spadeadam designs

“Innovation is all about collaboration – working together across the industry to build a better, more efficient and low carbon network for the future



Real-Time Networks pressure logger

- H21 – Strategic modelling, major urban centres
- H21 – Domestic and commercial metering

It will also include an update on the 2017 H21 Network Innovation Competition (NIC) bid.

#### HEALTH AND SAFETY MONITOR

This project will develop an active monitoring sensor for vibration, noise and wellbeing. The sensor will be incorporated into a smart watch design to be worn by operational employees. The data will be gathered and analysed automatically, sending alerts to the line manager when the employee is approaching the limit for exposure. Twenty prototypes have been developed and will be showcased at the conference.

#### INTEGREL

NGN will be sharing the details of its new £30 million INTEGREL facility (Integrated Electricity and Gas Research Laboratory). Located in Gateshead, the centre is a joint venture between NGN, Northern Power Grid (NPG) and the Newcastle University-led EPSRC National Centre for Energy Systems Integration (CESI). It will allow energy researchers and industry to carry out grid scale trials and experiments of coupled gas, electricity and heat systems for the first time.

#### SGN

##### REAL-TIME NETWORKS

Real-Time Networks aims to demonstrate a flexible 'real-time' network to meet Great Britain's current and evolving energy market

needs. A world first, prototype, real-time energy model will be developed through installation and demonstration of sensor technologies, associated hardware, software and infrastructure in a representative section of GB. Through this, SGN will demonstrate the viability and practical reality of a mixed-source, energy centric gas network for a more efficient, low carbon and potentially more affordable gas future.

#### ROBOTICS

SGN's robotics project is now reaching its conclusion. The final stage, Element 4, will develop a system capable of remotely reconnecting service pipes to an inserted main, without the need to excavate above each service connection. Using robots, SGN can provide precise measurements of service locations within the existing main, insert a PE main with specialised fittings already attached, and then enter and travel inside the existing service pipe through and knock through the fitting of the new live PE gas main.

#### 100% HYDROGEN

SGN and the other British gas distribution networks are undertaking a number of projects to support the future of energy in the UK. This feasibility study will develop site-specific evidence in support of a future physical demonstration of a 100 per cent hydrogen network, considering the whole gas supply chain.

#### SMART PAINTS

As more modern paint systems come



SGN robotics

to the market, the need has been identified to assess them for their suitability on the gas network and to review and update existing industry specifications to align them with currently available new technologies, products and suppliers.

#### MEET THE NETWORKS

As preparations begin for the LCNI Conference 2017 in Telford on 6 and 7 December, it's clear a lot of progress has been made in the past year, but it doesn't end there. Innovation is all about collaboration – working together across the industry to build a better, more efficient and low carbon network for the future.

Breakout sessions are being jointly hosted with the electricity networks, focusing on key challenges facing the energy sector, including: low carbon technology, gas connections, active network management, street works, storage and cyber security and big data. The conference will also host the IGEM Industrial Affiliates in another 'speed dating' session on day two, with the opportunity to pitch ideas to the gas networks. ■

■ The 2017 LCNI conference takes place at The International Centre, Telford, on 6 and 7 December 2017. Find out more and register at [www.lcniconference.org](http://www.lcniconference.org).