

Clever Stuff

OUR 2016 INNOVATION REPORT

We're Northern Gas Networks (NGN), the gas distributor for the North of England.

We keep 2.7 million homes and businesses cooking on gas in the North East, Northern Cumbria and much of Yorkshire.

There's lots happening beneath the surface

The gas industry has come a long way in recent years.

This report takes you behind our roadwork barriers, beneath the tarmac, into our offices and depots and under the bonnet of our vans, to show how we are using the latest technology and imaginative thinking to improve customer service, safety, save money and protect the environment.

The projects in this report have all been made possible by the Network Innovation Allowance (NIA) – a funding pot provided by our regulator, Ofgem, to support forward-thinking schemes.

Collaboration is key to what we do, and we work with an extremely broad range of businesses and stakeholders to develop projects.

If you'd like to find out more about us, and the potential to work together, please get in touch.

Website: northerngasnetworks.co.uk

Twitter: @NGNGas

Bringing ideas to life

GREAT IDEAS ARE NEVER IN SHORT SUPPLY AT NGN, BUT AS WITH ANY INDUSTRY, TURNING THEM INTO REALITY IS OFTEN A LONG, HARD ROAD. IT REQUIRES A GREAT WORKING RELATIONSHIP WITH OUR PARTNERS, AND RIGOUR AT EVERY STAGE OF THE PROCESS.

Story so far

We've completed **37** innovation projects since 2013/14. These range from a giant apple corer for roads (kind of) to the introduction of advanced new carbon monoxide detectors.

A further **32** live projects are in the pipeline.

£6.4m has been invested since 2013.

The 'i' in team

Our vision is to 'weave innovation into the fabric of NGN.' We do this by encouraging colleagues from across the business to lead innovation projects. This develops their experience and skills, while delivering benefits for the region.

We've also expanded our core innovation team, to inject some additional operational expertise. The team oversees all projects, and mentors colleagues.



I'm loving every minute of this project. I'm learning a lot about myself, as well as about gas powered vehicles!

Trevor Lister, Emergency Engineer, Leeds



The road to success

WE HAVE AN ESTABLISHED PROCESS TO GET IDEAS FROM THE DRAWING BOARD AND OUT ONTO THE NETWORK. ATTENTION TO DETAIL AT EACH STAGE AVOIDS A PROJECT HITTING THE BUFFERS.



BUSINESS CASE:
initial examination of the pros, cons and costs.



60 seconds with...

DENISE MASSEY,
MANAGING DIRECTOR,
ENERGY INNOVATION CENTRE

Working together

Utility companies often face the same challenges. Collaboration, within the sector and with the wider business community, is key to success. Here are some of the ways we do it:

Gas Innovation Governance Group:

A monthly gathering of UK gas distributors to share knowledge.

Low Carbon Network Innovation Conference:

An annual conference at which gas and electricity distributors showcase innovation projects.

Energy Innovation Centre (EIC):

The EIC acts as our go-between with the business community – inviting SMEs to provide solutions to challenges we face.

Cross Utility Innovation Group:

A group comprised of northern water, power and gas utilities to discuss and tackle challenges we have in common.

Collaboration in action

We recently approached the Energy Innovation Centre (EIC) for ideas to reduce noise on a sensitive work site in Hull.

The EIC put the brief out to the business community, and a Slough-based company called the Industrial Noise and Vibration Centre came back with a proposal for a new type of acoustic screen.

Two months later, the screen was in use – allowing us to dial down the noise. A great result!

“It was gratifyingly painless: one presentation to the EIC, a few emails and then an order for the trial project for innovative noise control measures from NGN. The whole process took less than two months – unprecedented speed!”

Peter Wilson, Director,
Industrial Noise and Vibration Centre



RESEARCH:

putting flesh on the bones.
Could this really work?



DEVELOPMENT:

time to hit the lab.



DEMONSTRATION:

testing in real-world
conditions.



IMPLEMENTATION:

final roll out. Success!

How does the EIC's relationship with NGN work?

We're like match.com for the business and energy sectors! We are able to help NGN and the rest of the energy sector to tap into the expertise of more than 2,000 SMEs.

Is it working?

Yes. SMEs often find it difficult to get a foot in the door with big utility companies, and this collaborative approach is changing all that. Similarly, it makes it easy for utility companies to source solutions from a very diverse group of businesses, all with different areas of expertise.

We've had a number of recent successes with NGN.

The company is great to work with, as everyone is really receptive to new ideas. You could never accuse NGN of being stuck in its ways!

What's next?

We'll continue to act as an extension of the company, helping NGN to realise its big ambitions.



RESEARCH

THE FOLLOWING PROJECTS ARE IN THE STARTING BLOCKS. THEY ARE FAR FROM TECHNOLOGICALLY READY – BUT EVERY PROJECT HAS TO BEGIN SOMEWHERE. THE GOAL IS TO EXPLORE THE POTENTIAL OF A NEW IDEA OR APPROACH.



Now we're motoring: teaming up with McLaren

PROJECT NAME:
ANALYTICAL
APPROACHES
TO ASSET
MANAGEMENT



**FOCUS
AREA:**

ASSET & NETWORK
MANAGEMENT

**PARTNER
ORGANISATIONS:**
McLAREN AND
KPMG

NIA FUNDING:
£188,500

The company behind a world-beating Formula 1 racing team and one of the world's biggest auditors may appear to have little in common with a gas distributor from the North of England.

But a new collaborative partnership is proving otherwise.

We've teamed up with McLaren and KPMG to gain new business insights from these two behemoths of the racing track and boardroom.

The project is allowing us to tap into the high performance culture, sophisticated analytics and business acumen of both companies.

PROJECT SUMMARY:

KPMG AND McLAREN ARE A FORMIDABLE PARTNERSHIP – AND TOGETHER THEY PROVIDE A CONSULTANCY SERVICE TO THE BUSINESS COMMUNITY.

Senior colleagues from both companies have worked with us on a 12 week project to see how we can improve our approach to asset management and make smarter investment decisions about our network.

The consultancy team included Lewis Hamilton's former racing engineer, and KPMG specialists in change management and analytics.

Next steps: we have completed an initial project focused on asset investment in three areas of the business, and are now embarking on a follow-up initiative exploring areas such as optimising the cost of booking gas from off-take sites and sensitivity analysis.



60 seconds with...

TONY PEARSON, NGN'S PREDICTIVE ANALYTICS HEAD



The worlds of Formula 1 and the gas industry seem poles apart. Is there anything we can learn from one another?

Lots actually! We both have a strong focus on asset performance; have to deal with factors beyond our control, such as the weather, and we both work in tightly regulated industries.

The McLaren racing team has to adapt its approach for each circuit, recalibrating every tiny detail in order to gain a competitive advantage. When it comes to optimising our network and improving the way we plan our investment programme, there's lots we can learn.

Why look to a different industry?

We stole the idea from our customer service team! The customer team has been very successful in looking beyond utilities, by benchmarking performance with companies such as John Lewis – UK leaders in customer service. We're hoping to achieve fresh insights by working with two very different, very dynamic industries.

What's next for the project?

The initial 12 weeks have been about getting to know one another, and identifying potential areas for further exploration. The next step is to narrow the focus and hone in on some key areas.

182

NUMBER OF GRAND
PRIX RACES WON BY
McLAREN SINCE 1966

152,000

NUMBER OF KPMG
EMPLOYEES AROUND
THE GLOBE

160

EACH McLAREN F1 CAR
HAS 160 SENSORS TO
CAPTURE PERFORMANCE
DATA IN REAL-TIME

156

NUMBER OF
COUNTRIES KPMG
OPERATES IN

BENEFITS

- Looking beyond the gas sector to gain new insights.
- A chance to work with world-leading experts in predictive analytics, sensitivity analysis and change management.
- An opportunity to make more accurate network predictions and investment decisions, leading to a better value and more reliable service for our customers.
- Phase 2 of the project may result in savings of £230,000 per year.

PARTNER INSIGHT

"KPMG McLaren Alliance and NGN worked together to investigate how advanced analytics techniques could be used to deliver improved performance outcomes in demand management and asset investment.

NGN have been trying to search for new ways to solve this challenge and looked to the Alliance for a fresh innovative perspective which will drive asset investment results."

**Simon Perks, Head of Power & Utilities,
KPMG McLaren Alliance**





RESEARCH

A national database: the missing link in customer service?

PROJECT NAME:
PROJECT CONCUR



FOCUS
AREA:

CUSTOMER
SERVICE

PARTNER
ORGANISATIONS:
FAHRENHEIT
212, ENERGY
INNOVATION
CENTRE, WIDER
UTILITY SECTOR

NIA FUNDING:
£20,000

Customer service has come on leaps and bounds in the utility sector, but we still face a widening gap between customer expectations and delivery.

One of the biggest barriers is data: we simply don't have enough of it, preventing us from giving customers the personalised support they demand.

We've teamed up with our fellow utility companies, innovation strategy

specialists Fahrenheit 212 and the Energy Innovation Centre, to explore the feasibility of a shared, UK customer database.

Is such a database practical, can it improve data collection, and will it pave the way for a new era of direct communication with customers?

This project aims to find out.

PROJECT SUMMARY:

WE'RE WORKING WITH THE WIDER INDUSTRY TO EXPLORE THE FEASIBILITY OF A NATIONAL CUSTOMER DATABASE.

Data would be sourced from participating utility companies, directly from customers and via third parties. Each company would tap into centrally stored information on the database to issue proactive communications to their regional customers.

A simple, uniform sign up process and national marketing campaign could improve customers' willingness to volunteer their information.

Next steps: an initial study has shown that there is an appetite among customers and utility providers for a national database and that the approach is feasible from a regulatory and technical point of view. There are, however, still some question marks about utility companies' willingness to share data.

The project is now moving to a second stage, which will develop a detailed business case and a solution blueprint.



60 seconds with...

EILEEN BROWN, NGN'S HEAD OF CUSTOMER SERVICE



What does a national database stand to achieve?

Efficient data collection is one area that our industry hasn't cracked yet, and there's no doubt it's holding us back when it comes to great customer service.

We often only get the data we need when something has gone wrong, such as an interruption to supply. Instead, we need to give customers a compelling reason to share their information with us all year round.

A more collaborative approach and a single call to action could really help with this.

Can it work?

There's a long way to go and a lot of hurdles to overcome, but I'm persuaded by the principle of a national database.

It involves changing the mindset of the sector, because we still tend to think regionally, rather than nationally. I know we can get there.



BENEFITS

- Personalised communication with customers (e.g. text message updates) in the event of gas, water or electricity loss.
- A national brand and standard sign-up process would improve customer awareness and conversion rates.
- Economies of scale through shared marketing and IT costs.
- Gives customers a reason to sign up: reassurance and peace of mind.

PARTNER INSIGHT

"Networks are all trying to gather data in isolation.

A collaborative approach, focused around a single customer proposition, stands to help utility companies source more of the data they need to give customers an exceptional service.

We're excited to be working with Northern Gas Networks and the wider utility sector on what could prove to be a major step change for the industry."

Rony Zibara,
Partner and Managing Director (London),
Fahrenheit 212





DEVELOPMENT

DEVELOPMENT PROJECTS ARE ABOUT MOVING A CONCEPT OFF THE DRAWING BOARD AND INTO THE LAB OR ONTO THE STREETS FOR FURTHER TESTING. THESE PROJECTS USUALLY RESULT IN A PROTOTYPE AND STILL HAVE A LONG WAY TO GO.

Building a greener future with carbon capture technology

PROJECT NAME:
CARBON CAPTURE
THROUGH
MINERALISATION



**FOCUS
AREA:**

FUTURE ROLE
OF GAS

**PARTNER
ORGANISATIONS:**
CAMBRIDGE
CARBON CAPTURE,
WALES & WEST
UTILITIES, ENERGY
INNOVATION
CENTRE AND
INNOVATE UK

NIA FUNDING:
£20,000

We're working with a Cambridge start-up company to explore a new way of capturing the carbon from gas such as shale or biomethane.

The process leaves behind hydrogen – an environmentally friendly fuel source – and a solid by-product (magnesium carbonate) which can be used as a fire retardant building material.

In producing a versatile, solid material out of thin air (kind of), while eliminating harmful greenhouse gases, we think this project could be onto something very exciting.

PROJECT SUMMARY:

'SWEETENING' GAS BY REMOVING CARBON DIOXIDE PREVENTS HARMFUL GREENHOUSE GASSES BEING RELEASED INTO THE ATMOSPHERE.

The process sees gas such as shale or biomethane put through a long tube, known as a bubble column reactor, to extract the carbon dioxide, leaving behind hydrogen.

Magnesium hydroxide is added to the extracted carbon dioxide, transforming it into a white solid material called magnesium carbonate, which has a

variety of potential applications. There is scope to use it as a building material, due to its excellent fire retardant properties, or to make tyres with low rolling resistance.

Next steps: initial lab tests have been successful and we are now moving to a second stage, which will explore the potential commercial market for the magnesium carbonate by-product.



60 seconds with...

RICHARD HYNES-COOPER,
NGN'S INNOVATION DELIVERY
MANAGER



Why is NGN involved in this trial?

It's got great potential – both to eliminate harmful greenhouse gases and produce a by-product which could prove valuable in lots of different sectors. And the gas left behind is hydrogen, which we're big fans of!

Why is hydrogen so important to NGN?

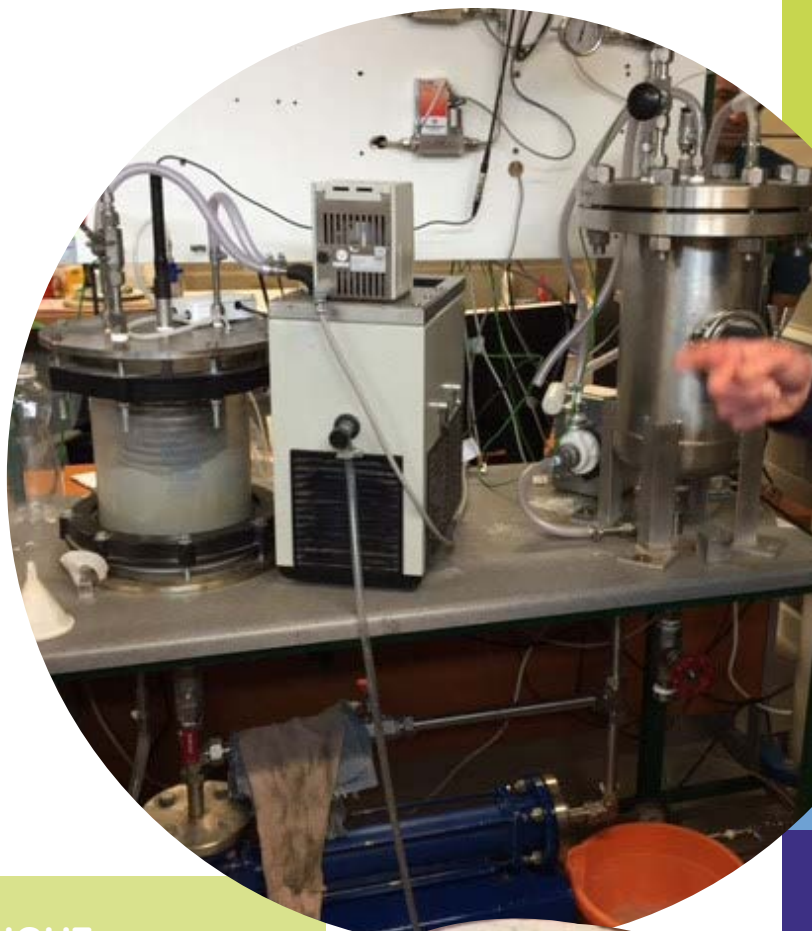
We think it has massive potential as a fuel of the future. We're working with Leeds City Council on a project to create the UK's first hydrogen city. We're thinking big.

What happens next?

The next stage is to look more closely at the real-world potential of this technology.

H₂O

BURNING HYDROGEN
PRODUCES WATER AND...
THAT'S IT!



BENEFITS

- 'Sweetening' gas by removing carbon prevents harmful greenhouse gases escaping into the atmosphere.
- Results in a by-product with potential applications in a variety of industries.
- An efficient means of generating hydrogen from different gas sources.
- Potential to apply the process to both fossil fuel gases such as shale, and sustainable gas sources such as biomethane.

PARTNER INSIGHT

"Our carbon capture and mineralisation technology has the potential to make a significant contribution to the reduction of CO₂ emissions from using fossil fuels.

Support from NGN provided us with much needed financial support and credibility by demonstrating end customer interest in our technology and a potential route to market."

Michael J Evans,
Chief Executive Officer,
Cambridge Carbon Capture





DEVELOPMENT

Here's one we made earlier: using pre-rolled pipe

PROJECT NAME:
SUBLINE
STRUCTURAL



FOCUS
AREA:

ASSET & NETWORK
MANAGEMENT

PARTNER
ORGANISATIONS:
RADIUS SYSTEMS

NIA FUNDING:
£330,000

We're big fans of a pipe renewal process known as 'roll-down' in which a new plastic pipe is reduced in size so it can be inserted into an old pipe, then expanded to form a tight lining.

The technique gives the old pipe a new lease of life, avoiding the disruption of having to dig large open trenches in the highway to replace it entirely.

The only snag is, the roll-down process is expensive, requiring a large rig to be hired and operated on site. For smaller jobs, it's simply cost prohibitive.

We've teamed up with our pipe supplier, Radius Systems, to see if they can provide a steady supply of pre-rolled pipe, so we can use this valuable technique more frequently.

PROJECT SUMMARY:

THE USUAL ROLL-DOWN TECHNIQUE INVOLVES BRINGING A MACHINE TO SITE WHICH REDUCES THE DIAMETER OF A NEW PE PIPE BY SQUEEZING IT BETWEEN A SET OF ROLLERS. THE PIPE IS THEN INSERTED INTO THE ORIGINAL MAIN AND EXPANDED TO ITS ORIGINAL SIZE USING WATER PRESSURE.

Unfortunately, the expense of hiring the rig prevents us using the technique on smaller jobs, so we asked Radius Systems if they could provide us with pre-rolled pipe, ready for insertion.

To do this, Radius Systems has had to introduce an extra stage in its pipe

manufacture process, with implications for the entire production line.

Next steps: Radius Systems began adapting its production process in February 2016. Work is progressing well, and we hope to start field trials of the pre-rolled pipe towards the end of 2016.



60 seconds with...

GARRY JUDGE, NGN'S PLANT AND LOGISTICS MANAGER



What's the thinking behind the project?

We love everything about the roll-down process, other than the cost. On larger jobs, where we have lots of pipe to renew, roll-down more than pays for itself, but for smaller scale projects, we can't justify the expense.

By working with Radius Systems to source pre-rolled pipe, we can avoid the expense of hiring a rig for smaller jobs, allowing us to use the technique far more often.

Was it easy to get the supplier on board?

A bit naively, we went to Radius Systems and suggested they simply bolt-on a roll-down rig to the end of the production line – little realising that this would have an impact on the rest of the process!

However, they saw the potential, and have risen to the challenge.

What happens next?

We're looking forward to putting the pre-rolled pipe to the test later this year.

100 TONNES

THE AMOUNT OF SPOIL SAVED BY USING THE ROLL-DOWN TECHNIQUE AT A SITE IN CASTLEFORD, WEST YORKSHIRE.

6 WEEKS

THE AMOUNT OF TIME SAVED BY USING ROLL-DOWN IN A BUSY SHOPPING DISTRICT IN WHITEHAVEN, CUMBRIA.

BENEFITS

- Pipe insertion avoids the disruption and expense of digging open trenches.
- Pre-rolled pipe allows the technique to be used on smaller jobs for the first time.
- Fewer holes in the highway is great news for motorists, local residents and businesses and reduces risk of injury to our engineers.
- The amount of spoil we need to send to landfill is significantly reduced.

PARTNER INSIGHT

"The challenge is to add the roll-down equipment while maintaining a smooth and constant flow on the extrusion line. We have built a small scale prototype, and will soon be introducing the process to our production line.

We hope the ability to supply NGN with coils of pre-rolled pipe will help them to reduce excavations and speed up jobs. We can see the real potential for the industry."

Matt Durand,
Head of Development Services,
Radius Systems





DEMONSTRATION

DEMONSTRATION PROJECTS ARE DESIGNED TO PUT A NEW PIECE OF KIT OR PROCESS THROUGH ITS PACES IN REAL-WORLD SCENARIOS, IN PREPARATION FOR FINAL ROLL-OUT.

Stepping on the gas

PROJECT NAME:
CNG VEHICLE TRIAL



FOCUS
AREA:

ENVIRONMENT

PARTNER
ORGANISATIONS:
LEEDS CITY
COUNCIL, CENEX

NIA FUNDING:
£65,000

Natural gas can be used to power vehicles, providing a cleaner, greener fuel alternative to petrol and diesel.

We've launched a trial with CENEX to put two natural gas work vehicles through their paces, to see how they compare to our traditional diesel vans.

Separately, we're also working with Leeds City Council on a project to build the UK's largest compressed natural gas (CNG) refueling station. If the new vans perform well, we could well be first at the pumps!

PROJECT SUMMARY:

WE'RE TRIALLING TWO NATURAL GAS VEHICLES OVER A 12 MONTH PERIOD. THE FIRST OF THESE, A CADDY VAN, IS ALREADY BEING PUT THROUGH ITS PACES BY ONE OF OUR MEASUREMENT TECHNICIANS, WHO MAP OUR PIPE ASSETS...

A larger flatbed truck, which we use to carry our roadworks barriers, will be hitting the road soon.

Trackers in the vehicles will measure key stats such as fuel consumption, mileage and emissions in a variety of different driving conditions. We'll be obtaining the same data from our diesel powered vehicles too, to provide a point of comparison.



The environmental benefits of using CNG over diesel are obvious. The big question is, is it practical to run a fleet of emergency and maintenance vehicles on gas?

Testing the new vehicles over a 12 month period means we can see how they perform in lots of different driving conditions, and with different colleagues behind the wheel.

The plans for a new CNG refueling station in Leeds means we'll have a ready supply of gas to keep us on the road.



Trevor Lister, NGN emergency engineer and trial co-ordinator



60 seconds with...

MATT JUDGE, NGN'S
MEASUREMENT TECHNICIAN



What are your first impressions of the van, Matt?

It took a bit of getting used to, but now I hardly notice the difference.

The most obvious things are higher revs – meaning I'm often in fifth gear at 30mph. On one or two occasions, I've also noticed a lack of power from a standing start at a roundabout or junction. But it's only been the odd time.

Other than that, the van is comfortable and performs well. Most of the time, I forget I'm in a gas powered vehicle.

How often do you fill it up?

I've been filling up an average of once a week, which is pretty typical, so no big issues there.

Obviously I can't just nip to the local Shell garage – so I do have to keep an eye on fuel and plan accordingly, but it hasn't been a big deal so far.

22.7 MILLION

NUMBER OF NATURAL GAS POWERED VEHICLES
CURRENTLY ON THE WORLD'S ROADS

80%

REDUCTION IN OZONE FORMING
EMISSIONS COMPARED TO
PETROL OR DIESEL.

BENEFITS

- CNG is far less harmful to the environment than diesel or petrol. It contains no particulate emissions and 90% less nitrogen dioxide.
- We're working with Leeds City Council to develop the UK's biggest CNG fuelling station – making a gas powered vehicle fleet more viable.
- Initial feedback from engineers has been positive, with drivers noticing little difference in vehicle performance.

PARTNER INSIGHT

"The trial is designed to give NGN all the information it needs to decide how to implement CNG technology in its vehicle fleet in the future.

We're monitoring everything from vehicle performance to driver attitudes, and are also using simulation techniques so that the results can be extrapolated for different vehicles and job roles not directly involved in the trial."

Steve Carroll, Senior Technical Consultant, CENEX





DEMONSTRATION

Sniffing out leaks

PROJECT NAME:
PAW PATROL



FOCUS
AREA:

ASSET & NETWORK
MANAGEMENT

PARTNER
ORGANISATIONS:
BK INTEGRITY

NIA FUNDING:
£3,250

Dogs' exceptional sense of smell has been used successfully in sectors ranging from crime prevention to petrochemicals, but never before in the UK gas distribution industry.

We've launched a project to see if dogs can be trained to locate gas leaks, helping to speed up repairs and reduce the need for our engineers to dig exploratory holes in the road.

When we first announced this project, the industry thought it was a shaggy dog story – but it's really working!



PROJECT SUMMARY:

DOGS CAN BE TRAINED TO SNIFF OUT ALMOST ANYTHING, INCLUDING MERCAPTAN – THE CHEMICAL THAT GIVES GAS ITS DISTINCTIVE ODOUR.

While electronic gas detection technology such as the gascoseeker has come a long way, it still doesn't come close to the sensitivity of the canine nose.

We carried out a series of controlled trials to see if a trained sniffer dog could detect items scented with gas. This 'double blind' test was very successful, despite challenging weather conditions,

giving us confidence that the concept is sound.

Next steps: The first phase trial was a resounding success and we are now preparing for a second phase. This will involve laying gas pipe at varying depths, to see how the dog performs compared to a human engineer armed with the latest technology.



60 seconds with...

GARY TUPPER, NGN'S MEASUREMENT TECHNICIAN



How did the idea to use dogs come about?

Before joining NGN, I worked in the police force. The concept of using dogs to detect leaks seemed obvious to me. Having seen police dogs in action, I knew how capable they were.

Unfortunately, everyone else in the company thought I was barking! I eventually managed to win some colleagues round and the results of this trial are now helping to convert the remaining doubters.

But can dogs beat technology?

No current technology comes close. Dogs are capable of detecting just about anything. The only limits are those of our own imagination.

What's next for the trial?

We're carrying out a second stage trial involving buried gas pipes – presenting an even more realistic scenario for the dogs.

Taking the trial to its logical conclusion, we may ultimately arrive at a situation where we have a small dog handling unit within the business, with a couple of trained dogs we can use across the network. As well as being a great asset for our engineering teams, they would be fantastic in helping us to engage with schools and local communities.

300 MILLION

AVERAGE NUMBER OF OLFACTORY
SENSORS POSSESSED BY DOGS.
COMPARES TO 5 MILLION IN HUMANS

26FT

DOGS CAN DETECT
SMELLS UP TO 26 FEET
UNDERGROUND

PARTS PER TRILLION

SOME DOGS CAN DETECT
ODOURS AT PARTS PER TRILLION

BENEFITS

- Potential to pinpoint leaks quickly, speeding up repair jobs.
- Accurate leak detection reduces the number of exploratory holes we need to dig, avoiding environmental waste and traffic disruption.
- Potential to apply the approach to other aspects of our work, such as carbon monoxide detection.
- Employing dogs as leak detectors is great from a community relations point of view – helping us engage with customers of all ages.

PARTNER INSIGHT

"Dogs have been used very successfully in the oil and petrochemicals industry, so when NGN contacted me for support in this trial, I jumped at the chance to get involved.

There is no technology in existence that can come close to the sensitivity of a dog's sense of smell. The biggest challenge is usually getting colleagues to buy into the concept.

I'm looking forward to working with NGN on the next phase of the trial, which will involve a life-like scenario on a pipe network."

Brian Kerrigan, BK Integrity





IMPLEMENTATION

THE FINAL STAGE OF THE INNOVATION PROCESS. A CONCEPT HAS BEEN THOROUGHLY TESTED; A PROTOTYPE DEVELOPED; FIELD TRIALS COMPLETED, AND NOW IT'S TIME TO INTRODUCE THE PRODUCT OR PROCESS TO THE WORKFORCE AND CUSTOMERS.

No longer stumped by stubs

PROJECT NAME:
STUB END
ABANDONMENT



FOCUS
AREA:

ASSET & NETWORK
MANAGEMENT

PARTNER
ORGANISATIONS:
STEVE VICK
INTERNATIONAL

NIA FUNDING:
£174,000

Gas distributors are tasked with decommissioning all small diameter gas pipes close to buildings, for safety reasons, by 2032.

Previous techniques for capping off these pipes left a short 'stub' of live pipe, where the small pipe abutted a larger diameter main. This presented the dilemma of potentially having to dig up these stubs, at great expense and public inconvenience.

Together with our supplier, **Steve Vick International**, we've refined the legacy technique, to cap off a pipe without leaving a pesky stub. After an extensive development and trial phase, the improved process is now being used extensively across our region.

1,700 CUBIC METRES

VOLUME OF SPOIL TO LANDFILL
SAVED SO FAR.

80%

THE NEW TECHNIQUE REDUCES SIZE OF
EXCAVATIONS BY AT LEAST 80%

£500,000

AMOUNT SAVED ON THE FIRST 110 JOBS
USING THE NEW TECHNIQUE.

PROJECT SUMMARY:

AN EXISTING TECHNIQUE TO CAP OFF SMALL DIAMETER PIPES USING A FOAM BAG INSERTED INTO THE MAIN HAD ONLY BEEN PARTIALLY SUCCESSFUL. IT LEFT A SHORT STUB WHERE THE PIPE ADJOINED A LARGER MAIN.

Working with our supplier, Steve Vick International, we launched a project to refine the foam bags, so they could abut right up to a larger main, leaving no gap or stub.

The development process included lab tests, followed by field trials. The new and improved process is now being used extensively across our network.

Next steps: more than 110 of the new style bags have been put into the ground to date, and the process is rapidly becoming business as usual.

Data has been shared with other gas distributors, so they can replicate the approach if they so choose.



60 seconds with...

RICHIE READ, NGN'S INNOVATION IMPLEMENTATION MANAGER



It must be a good feeling to see this technology finally being rolled out across the network?

It is. The new foam bags are a game changer for us. No more stubs!

It's been a great experience to work alongside our supplier, Steve Vick International, to improve existing technology and put it to the test, first in the labs and then out on the network.

Has it been a hit with the operatives out on site?

It's been a pretty easy sell, as it reduces the amount of digging they need to do in roads and footpaths. That frees up time, improves safety and reduces inconvenience for the public. Our engineers quickly saw the advantages.

How much money is being saved?

We're already saving several thousand pounds per job.

WHY DO PROJECTS FALL AT THE FINAL HURDLE?

"Many of us in the gas industry have experienced that feeling of guilt when brushing past a piece of tech that's gathering dust in the corner of the office. It was the gadget that was going to change the world, but for some reason, it never took off. Great ideas are in plentiful supply, but unless we can implement them properly, they're always going to struggle to become business as usual.

At NGN, we have a detailed process called G23, which provides a roadmap for a project from that initial lightbulb moment through to final implementation. At each stage, the project manager is required to step back and consider every detail, using a template to record salient information.

This process is especially important at the implementation stage. A project or process has proved its worth in field trials, but now it's time to consider a whole host of additional issues. Who, within the business, is going to be using this fantastic new gizmo or process? Have they bought into it? What are the training requirements? Have risk assessments and safety issues been fully locked down?

Leaving no stone unturned at this stage can often make the difference between a well implemented project and a missed opportunity."

**Peter Christie, Quality Assurance Manager,
Northern Gas Networks**

BENEFITS

- The improved foam bag technique no longer leaves a live stub – rendering the pipe fully inert.
- A cost effective process, with savings of more than £500,000 on the first 110 jobs.
- Volume of spoil to landfill has been slashed.
- The foam bag can be inserted up to 60 metres away, avoiding traffic sensitive areas.
- The process can be implemented under 'live' conditions – meaning we don't need to switch customers off gas.

PARTNER INSIGHT

"We first developed our foam bag technique more than 20 years ago. NGN recognised that recent technologies could further enhance the existing system, and we've enjoyed working with the company to set a new standard."

**Sean Noonon,
Operations Director,
Steve Vick International**



Several aspects of the original foam bag have been improved, including superior fabric and a new sewing method.



IMPLEMENTATION

Water extraction camera prevents a drain on resources: Water and gas don't mix

PROJECT NAME:
REMOTE WATER
REMOVAL



FOCUS
AREA:

ASSET & NETWORK
MANAGEMENT

PARTNER
ORGANISATIONS:
SYNTHOTECH

NIA FUNDING:
£274,000

When water finds its way into our network, due to flooding or a burst water main, it can often take days to remove, leading to major disruption for customers.

We teamed up with engineering specialists Synthotech to develop a faster way of tackling water ingress.

The process uses a remote camera which is sent down pipes to spot water, and simultaneously pump it out.

The groundbreaking technology has recently proved its worth on several major water ingress incidents, helping us to restore customers' gas supplies more quickly.

PROJECT SUMMARY:

WHEN WATER FINDS ITS WAY INTO A GAS MAIN, THE USUAL PROCESS IS TO DIG MANY EXPLORATION HOLES TO FIND AND REMOVE IT. THIS IS HUGE TIME CONSUMING AND IT IS NOT UNUSUAL FOR CUSTOMERS TO GO WITHOUT GAS SUPPLY FOR SEVERAL DAYS.

Working with partner company Synthotech, we have developed a CCTV camera which can be sent into pipelines to locate where the water is and extract it using an internal pump.

A smaller piece of kit for extracting water from service pipes, the connecting pipes which serve individual properties, has also been developed.

Next steps: the technology underwent successful field trials in 2015, and has since been used in several live water ingress incidents, including a hugely challenging incident in Consett, County Durham.

Rob's vision becomes a reality



NGN network technician Rob Arthur has every reason to feel proud. Without his vision, we never would have launched our new kit for tackling water ingress.

Rob developed a prototype suction pump and camera combination to extract water from service pipes - the small connecting pipes which serve customers' homes. He did much of this work in his spare time from his garage!

Synthotech took the prototype and developed it into a larger production model, now being used on gas mains. The smaller service pipe version – Rob's original vision – is now going through final field trials, and will soon hit the streets.

Rob said: "Water ingress has been a big problem ever since I started in the industry in 1979. I asked the business if I could take a look at a different kind of solution and they were happy for me to run with it.

I took the prototype as far as I could and then called on Synthotech to take it to the next level.

This began as one man in a shed and is now an industry leading piece of technology. It's a good feeling!"

PUTTING THE TECH TO THE TEST

Back in November 2015, more than 750 properties in Consett, County Durham lost their gas supplies for three days, after a burst water main flooded our network.

Without our new camera technology, we believe it could have taken several more days to locate and remove all the water and restore supplies to customers.

BENEFITS

- Able to spot and extract water without the need to dig numerous exploratory holes.
- Saves time and money.
- Allows us to get customers' gas back on more quickly.
- A gas recirculation system means it prevents gas being lost to the atmosphere while we are clearing the mains of water.

PARTNER INSIGHT

"Working with Northern Gas Networks, we set out to change the way the UK gas industry deals with water ingress. I believe we've achieved that."

David Morgan,
Managing Director,
Synthotech Limited

“The speed of response, effort and commitment of all involved was quite frankly, superb. Heating, cooking, food and accommodation of the vulnerable were superbly addressed by a professional team who were completely customer and community focused throughout the emergency.”

Consett Councillors
Bob Glass and
Jane Brown



WINNER!

WON THE 2016 IGEM
INNOVATION PRODUCT AWARD.

Investing wisely

Our Network Innovation Allowance (NIA) funding is focused on four core areas. Below, we have set out what we spent in 2015/16 in each area and how this compared to our expectations.

As the figures show, investment was largely in line with predictions, with the exception of 'safety and environment.' There will be increased focus on this area going forward and we have allocated additional project spend in 2016/17.



Asset & network management



Safety and environment

Recommended spend for 2015/16: 35%
Actual spend: 48%
Projected spend for 2016/17: 35%

Recommended spend for 2015/16: 15%
Actual spend: 7%
Projected spend for 2016/17: 20%



Customer service



Future role of gas

Recommended spend for 2015/16: 5%
Actual spend: 1%
Projected spend for 2016/17: 10%

Recommended spend for 2015/16: 45%
Actual spend: 44%
Projected spend for 2016/17: 35%

LEARNING ISSUES:

BY ITS VERY NATURE, DEVELOPING NEW PRODUCTS AND PROCESSES IS A LEARNING EXPERIENCE. WE MUST TAKE LESSONS FROM OUR SUCCESSES AND FAILURES AND APPLY THEM TO FUTURE PROJECTS.

Here are some of the big lessons from the past 12 months:

LEAVE NO STONE UNTURNED:

Attention to detail, at every stage of the process, is essential for success. Pretty obvious really, but we can't stress it enough!

COLLEAGUE BUY-IN IS VITAL:

It's all very well having a great new product or technique, but if the operatives who will be using it haven't bought in, you face an uphill battle. Selling the benefits, and providing appropriate training, is vital.

COMMERCIAL IMPERATIVE VS. GETTING IT RIGHT:

We work with a lot of third party developers on products, who are understandably keen to get solutions out into the wider marketplace. We've found this can sometimes create tension, with partners wanting to shout about a product before we feel it is completely ready. Having a good relationship with partners is crucial in these circumstances.

PERSISTENCE CAN WIN THE DAY:

Turning an idea into a living, breathing project can be a long hard road and sometimes sheer dogged determination is the only way to make things happen.

Speaking of dogged determination, our sniffer dog trial (see pages 16/17) only came about because our colleague, Gary Tupper, believed in the project and refused to give up. A lesson to us all!

EARLY ENGAGEMENT WITH THE WIDER BUSINESS IS CRUCIAL:

Our project proposals, once eligible for NIA funding, are sense checked by a steering group called Think Tank. The group comprises representatives of key business areas. In addition to a balanced project assessment, the Think Tank provides transparency on what we do and raises the profile of the department in line with our vision.

TRICKY BENEFITS TRACKING:

Quantifying a project's benefits is often a hard nut to crack. However, we are getting better at this and benefits identification is embedded in our NIA project process from the very early stages of assessment.

Thanks for your time

We hope you found
this report useful.

If you'd like to know
more about us and
our love of innovation,
please get in touch.

northerngasnetworks.co.uk

 [@NGNGas](https://twitter.com/NGNGas)

Smell gas?

The National Gas Emergency Service is
available 24 hours a day, every day.

FREEPHONE 0800 111 999*

*All calls are recorded and may be monitored.