



# Annual Innovation Summary 2022/23



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# A word from our CEO, Mark Horsley



## Innovation to tackle challenges of a changing world

The energy industry is changing at an incredible pace. The cost-of-living crisis, climate change and geopolitical uncertainties pose significant challenges that our sector must rise to at an unprecedented rate.

Innovation and the way we use technology has a crucial role to play in meeting these challenges, and this year we're continuing to push boundaries.

The Network Innovation Allowance (NIA) funding stream and Strategic Innovation Fund (SIF) that we receive from our regulator, Ofgem, are vital tools in developing and targeting solutions to where they are needed most – addressing the 2050 Net Zero target and customer vulnerability.

Customers and stakeholders have told us they want networks to develop clean and sustainable forms of energy, and to identify a clear pathway towards net zero, whilst continuing to provide a top-class 24-7 service and support for our most vulnerable communities.

Helping the most vulnerable on our network is something we are absolutely committed to, now and for the years to come, and innovations such as our Vulnerability Mapping Tool are giving us unparalleled insight into community-specific challenges, while pinpointing support where it's needed most.

All our projects are now assessed in their initial plans to make sure they deliver benefits to vulnerable households and communities, and we're constantly upskilling our frontline engineers to spot signs of vulnerability when attending gas escapes.

Meanwhile, our work to develop solutions that support the energy transition to net zero has continued to progress. Projects like Customer Energy Village Energy Efficiency are

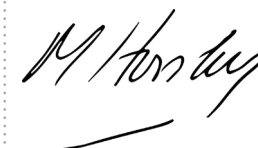
exploring how consumers can continue to maintain choice in the way they heat their homes, while Wider Impacts of Hydrogen is deepening the knowledge base and providing vital answers on a hydrogen network conversion.

As the RIIO-GD2 regulatory period continues, innovation remains more important than ever in supporting delivery of our overarching objectives: provide a safe, reliable gas service; support the transition to net zero; continue to modernise our operations and provide help to our vulnerable customers.

I hope you find this year's report inspiring. Please do contact our innovation team if you'd like to find out more or if you have a suggestion for how we can work together.

### Mark Horsley

Chief Executive Officer  
Northern Gas Networks



# Introduction

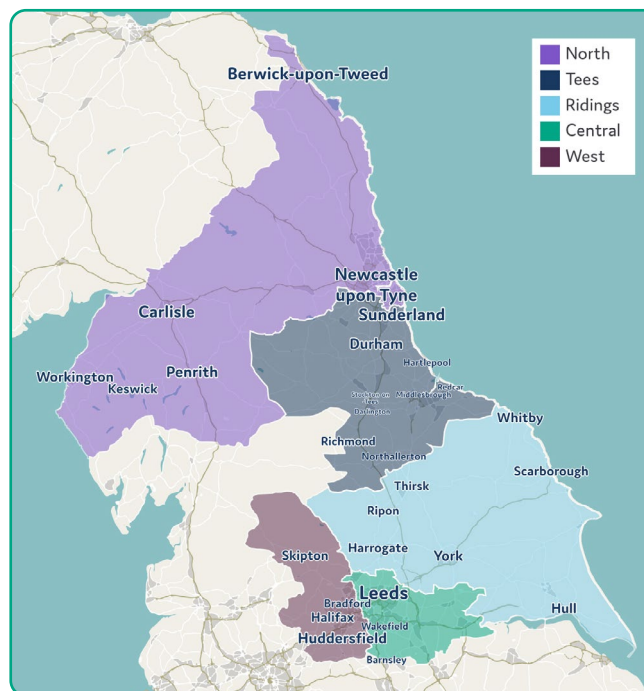
## About us

**We are Northern Gas Networks (NGN), the gas distributor for the North of England. We keep 2.7 million homes and businesses cooking on gas, through our vast underground pipe network.**

We are committed to providing a safe, reliable and great value service to our customers and stakeholders, while developing new technologies to deliver forms of low carbon energy, such as hydrogen, to support a greener future. Innovation underpins everything we do – whether we are replacing pipes, fixing leaks, developing low carbon energy solutions or supporting our most vulnerable customers.

By thinking differently, listening to our colleagues and stakeholders, working closely with our partners and considering our communities, we are pushing the boundaries of what a utility company is capable of.

NGN Region



## About this document

NGN receives funding from our regulator, Ofgem, which allows us to take forward innovation projects that will contribute to addressing challenges faced by vulnerable customers and facilitate the energy systems transition to a greener future.

In RIIO-1 we led successful innovation projects across both the Network Innovation Allowance (NIA) and Network Innovation Competition (NIC).

The RIIO-2 settlement saw a continuation of NIA, with the NIC superseded by the new

Strategic Innovation Fund (SIF). This report covers how we've used both our NIA and SIF funds in the 2022/23 regulatory year to undertake essential research and identify opportunities to develop new products, methodologies and services. Additionally, we have continued to build on our evolving culture of innovation at NGN, investing in market-ready solutions and developing new ways of working into our business-as-usual operations.

2022/23 has seen further progression of our energy futures activity, with continued development on our hydrogen innovation programme. To compliment this work,

we have progressed further with projects to deliver essential evidence needed to determine the requirements and opportunities of the 'whole energy system' such as the Customer Energy Village.

We've also seen significant progression of our IoT (Internet of Things) innovation theme, with advanced development of the Digital Pressure Sensor solution.

At the heart of our activity is our focus to support customers in vulnerable situations, and we have increased collaboration with other gas and electricity network licensees, to ensure that all elements that may impact our customers are assessed.

## Meet the Innovation team

### Nick Smith

Innovation Manager

[nsmith01@northerngas.co.uk](mailto:nsmith01@northerngas.co.uk)

### David Lynch

Strategy Manager – Energy Systems Transition

[dlynch@northerngas.co.uk](mailto:dlynch@northerngas.co.uk)

### Lewis Kirkwood

Innovation Development Manager

[lkirkwood@northerngas.co.uk](mailto:lkirkwood@northerngas.co.uk)

### Steven Dacre

Vulnerability Innovation Lead

[sdacre@northerngas.co.uk](mailto:sdacre@northerngas.co.uk)

### Nadia Hassani

Innovation Portfolio Manager

[nhassani@northerngas.co.uk](mailto:nhassani@northerngas.co.uk)

# How we fund our innovation programme

We have continued to grow our innovation culture and embed this into our way of working across the business. We innovate through a wide range of funding methods, but mainly with the help of two vital funding streams, NIA and SIF.

## Ofgem Network Innovation Allowance (NIA)

A backbone of innovation in RIIO-1, this funding stream continues in the new regulatory period RIIO-2. It's allocated to a wide range of innovation projects assessed and approved by NGN, all of which have the potential to support vulnerable customers and help facilitate the transition to net zero.

This report outlines some of the exciting projects made possible by NIA funding this year. Further project details, including progress and closure reports, can be found [here](#).

## Ofgem Strategic Innovation Fund (SIF)

This funding stream of £450 million is available to UK gas and electricity networks to access between 2021-2026. Unlike the NIA funding, this more targeted funding is available for projects that eventually accelerate the transition to net zero, to help the UK become a 'Silicon Valley' of energy.

The fund has three phases to take a project from the drawing board stage to final delivery. With each phase, the value of investment increases.

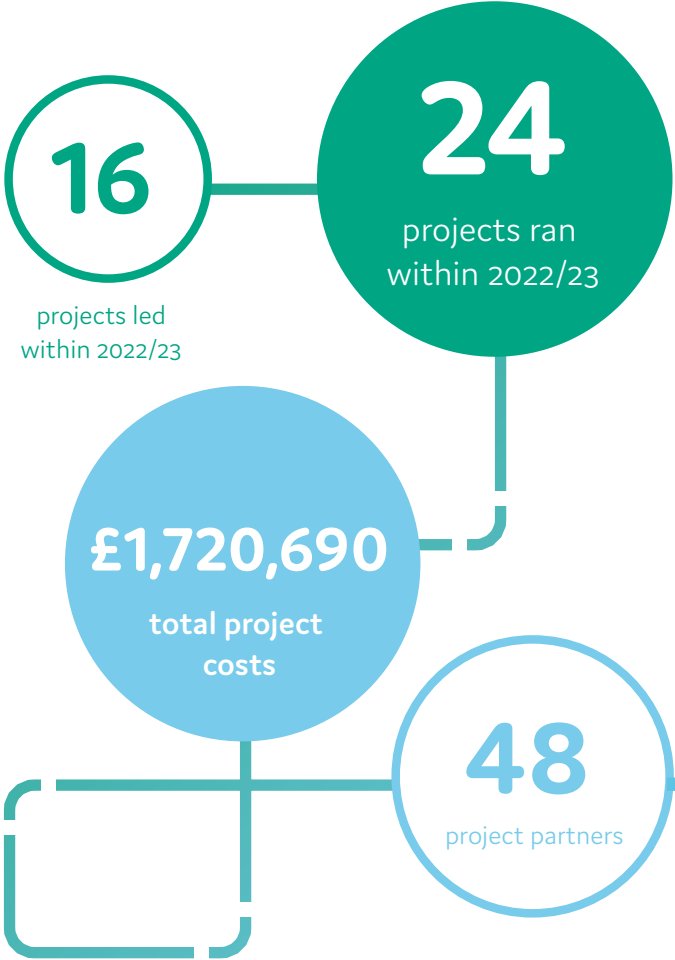
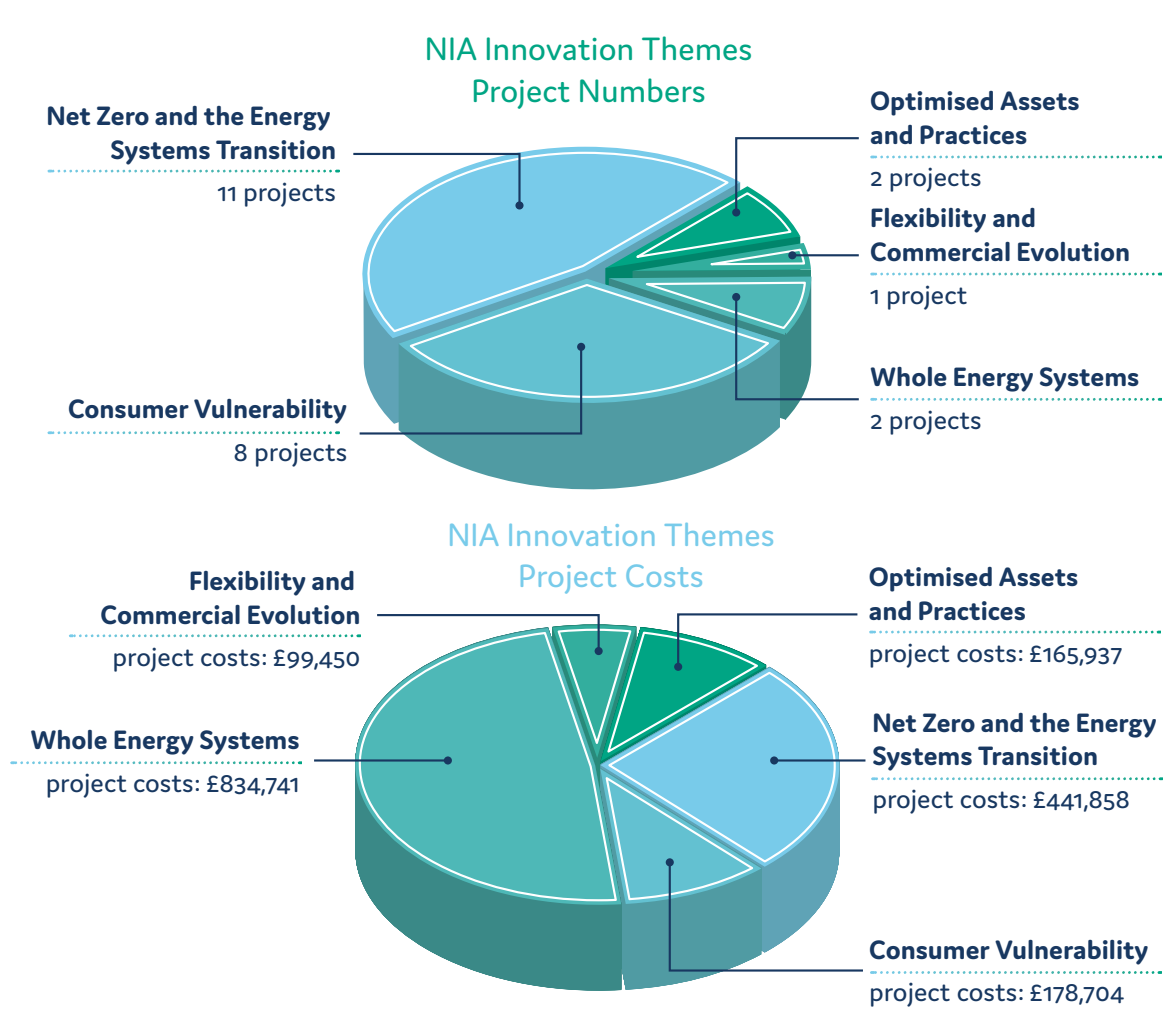
You can read about one of our SIF-funded projects, later in this report.

## Additional funding

Some of our innovation portfolio is also funded through Total Expenditure (TOTEX), third-party and alternative business sources, to drive efficiencies and enable process improvements across NGN's operations, by refining and implementing products at a higher technology readiness level.



# Innovation portfolio funding insights





# Pushing the boundaries of what a utility company is capable of

Innovation is stitched into the fabric of everything we do at NGN, from replacing pipes, to supporting our most vulnerable customers. Through our trailblazing projects and ideas, we are delivering some life-changing benefits to 2.7 million homes and businesses across the North East, Northern Cumbria and Yorkshire, while helping to facilitate a low carbon economy.

Our innovation activities have enabled us to deliver £6 million' of savings to our customers in RIIO-1. In RIIO-2, we're going further than we ever have before to progress the most innovative, invigorating, future-proof and sustainable ideas that will reduce customer bills and improve the levels of service we provide. This means having the confidence to challenge accepted norms, and to explore if there are better and more efficient ways of operating and delivering change.

A culture of collaboration and innovation permeates our whole business, empowering our team to think big and innovate every single day. We persistently trial, test and develop new ideas to expand our capabilities and break the cycle of what's been done before. We push forward in our mission to become the leading gas distribution network for innovation, and the 'go-to' for ambitious suppliers and small-to-medium-size enterprises who want to trial and develop new products and services. That means we're progressing innovation projects at speed, with a fail-fast approach supported by robust project management and evaluation.

## NGN RIIO-2 priorities

- We are expanding our training, streamlining our internal processes, pioneering collaborative thinking and revolutionising practices across our business to ensure innovation runs through our veins, always
- We are working even more closely with our stakeholders to involve them in our innovation
- We are investing in projects that deliver new technologies with better outcomes for our customers and stakeholders
- We are reducing the cost of innovation to our customers by asking shareholders and innovation partners to offer greater financial contributions towards specific projects, whilst we also leverage different funding mechanisms
- We take learnings from leading innovators across a range of sectors, not just within energy, to improve our business
- We scrutinise our innovation portfolio to demonstrate that innovation investment is delivering value for money.

NGN Innovation delivers improvements for our customers and networks in the transition to Net Zero, actively seeking ideas to help modernise today and prepare for tomorrow. Through collaboration with colleagues and suppliers, we're developing new and novel solutions to deliver valuable benefits and make lives easier.

# What's different in this regulatory period?

**Our RIIO-2 strategy has been to place an even greater emphasis on collaboration to solve the major challenges facing gas networks and the wider energy industry today, with funding focused on energy systems transition and making sure that vulnerable customers are protected.**

**This has manifested in some data-driven innovation projects that have one of two key challenges at their heart:**

**Delivering whole energy solutions that help move the UK towards net zero**

**Addressing the needs of customers in vulnerable situations so that we can help reduce fuel poverty**

Each innovation project has been stimulated by Ofgem's drive for efficiencies and providing evidence for better, safer services. We've continued to transform our operational capabilities, by further embedding innovation into our business as usual. We've moved away from traditional operational efficiency projects, to explore our business needs to develop in order to facilitate the transition to a low carbon economy. That means we're concentrating on future-facing data and digitisation innovation projects, ensuring all customers, especially vulnerable ones, are catered for as we transition into the future energy system.

NIA funding has unlocked some of our most targeted, tactical innovation ideas that are in line with the ever-changing future landscape of energy. Our NIA portfolio comprises agile research and development projects that allow us to explore and de-risk solutions, helping to deliver against strategic challenges as efficiently as possible. They continue to provide vital evidence to policymakers and people who make big decisions, affecting real change in the industry. If we spot something today, we can innovate on it tomorrow with the help of NIA because it allows us to pivot quickly and react to changes.



# Project case studies

## Case study contents

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### NIA funded projects

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### SIF funded projects

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### Additional NIA projects

16/17

# Internet of Things (IoT) Pressure Sensor Pilot

## KEY THEME: OPTIMISED ASSETS AND PRACTICES

**Project reference:** NIA\_NGN\_303

**Project partner:** Renda Systems

**Overall project value:** £779,350

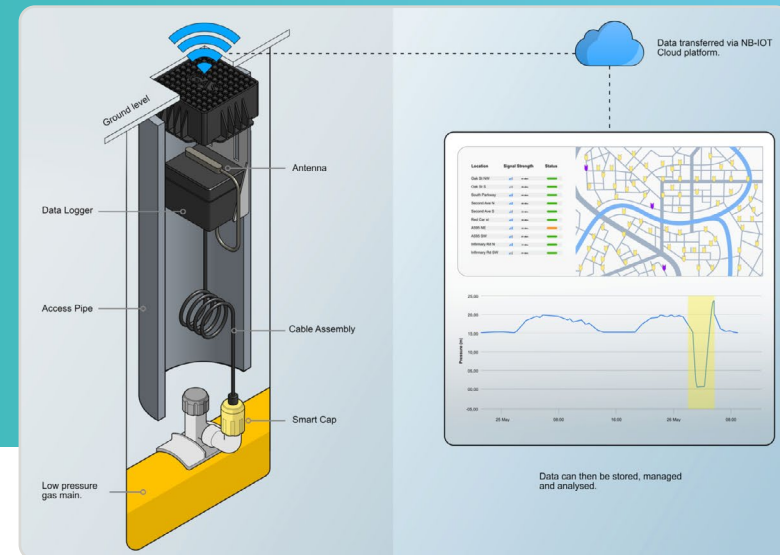
### Project summary

This groundbreaking project, funded by the Ofgem Network Innovation Allowance, is focused on collecting data from the Low-Pressure gas networks that service neighbourhoods across the North of England, to enable and demonstrate digitalisation of networks.

We need more data to better inform both current and future investment decisions for operating Low-Pressure networks. At the moment, we rely on information about the network from gas pressure data-logger units, or a customer calling the National Gas Emergency Service call centre to tell us there's a problem with the gas supply to their home. An engineer is then despatched to site to investigate, costing time delay and causing potential disruption to customers. Imagine if we could create an automatic digital alert from the pipes themselves, to tell us what's going on in real-time? We partnered with local Internet of Things experts, Renda Systems, to develop a revolutionary new product: a Smart Cap, which has been designed to seamlessly integrate onto existing gas network infrastructure.

It consists of an everyday plastic cap component containing an integrated pressure sensor which monitors gas pressure and transmits data to NGN's Cloud. The Smart Cap technology also has the potential to evolve to monitor temperature, moisture and gas composition in the future, allowing even more efficient decisions to be made, unlocking new analytical approaches to supply management, and opening up the opportunity to involve advanced AI systems in the future.

*"Think of it like the digital maps you have on your phone, where you can view thousands of Smart Cap nodes everywhere, lighting up red if there is a problem so NGN knows exactly where to go to fix things in real-time. Start ingesting other available or open-source data, like weather, to enrich the information, and layer on machine learning and AI, and in time we'll be able to carry out predicted maintenance before problems even start." - Andrew Howes, Renda*



*"The IoT Pressure Sensor opens up a whole new understanding of our Low-Pressure Network, giving us the real-time data we need to transform our day-to-day processes and the way we support NGN customers. It's also a retrofit package that builds on methods already used right across the UK, meaning it will be quick and efficient to deploy. The benefits for our customers and NGN are huge."*  
-Nick Smith, NGN Innovation Strategy and Delivery Manager

On completion of ATEX certification, the new IoT Pressure Sensors will be piloted in our Customer Energy Village near Gateshead in 2023, before deploying across different regions of NGN's network.

### Key benefits

- Provides far more advanced notification of network issues than is currently possible with today's technology
- Improves efficiencies and increases resilience of the network
- Supports NGN's role in delivering the Energy System Transition
- Quick to deploy
- Significantly lower cost than a traditional data-logger solution, once deployed at scale

# Visualising the Opportunity for Pipeline Hydrogen for Mobility Applications

**KEY THEME: FLEXIBILITY AND COMMERCIAL EVOLUTION**

**Project reference:** NIA\_NGN\_420

**Project partner:** Element Energy and Transport for the North

**Overall project value:** £99,450

## Project summary

The UK Government has committed to making new heavy-duty vehicles (HDVs) zero emission by 2040, so the race to find alternative fuel solutions to petrol and diesel is firmly on.

We think hydrogen is one solution, so we're working with Element Energy and Transport for the North to create a dynamic visualisation tool that will demonstrate the feasibility of hydrogen as an alternative fuel.

The unique tool will identify and map where the largest numbers of HGVs, buses, trains, refuse collection vehicles and ports are located, and pinpoint the places most likely to have the highest uptake for hydrogen fuel. We will also provide maps of where our gas pipes are, to show suitable connection points.

Once the project is complete, we will have identified 70 sites where hydrogen refuelling stations should be sited, and the visualisation tool will let us strategically plan how we can best utilise our existing pipe network to deliver hydrogen to these sites.

## Key benefits

- Highlights optimal locations for hydrogen refuelling stations across the North of England
- Identifies how our existing pipe network can deliver hydrogen, eliminating the need for costly new networks
- Delivering fuel via the pipe network is more cost effective than delivering it via refuelling vehicles (if all 70 identified stations were connected to the gas grid, it could create more than £3 billion in added value to the NP11's gas network operators over the lifetime of the station network)
- Eliminates the need for large refuelling vehicles, further reducing carbon emissions and traffic on the roads.



*"Decarbonising the heavy transport sector is something that hasn't been looked at for more than 30 years, so this is a move to help change that. The technology to create batteries large enough to power HDVs isn't there yet, so looking at alternative fuel sources like hydrogen is something that needs to be done at speed."*

*"Our new visualisation tool will enable us to effectively plan for delivering hydrogen as an alternative fuel, and we can collaborate and share our findings with other transport bodies, energy network companies and the Government, so that they can benefit from this project, too. Incorporating multiple industries, the project is a great advocate for the whole systems thinking."*

*"It will also allow us to work out how we can use our existing gas network to deliver hydrogen to fuel stations, eliminating the need for new infrastructure that would have to be funded by taxpayers."*

*"This is the first project of its kind and will act as a starting point for whole industry change."*

**- Lewis Kirkwood, Innovation Development Manager at NGN**



# Customer Energy Village, Project 1: Energy Efficiency

## KEY THEME: WHOLE ENERGY SYSTEMS

**Project reference:** NIA\_NGN\_345

**Project partner:** Newcastle University, National Energy Action, EIC

**Overall project value:** £1,037,155

### Project summary

The Customer Energy Village (CEV) in Low Thornley, Gateshead, is a pioneering project that will help the energy industry discover the best technologies to use for adapting and retrofitting existing UK homes to achieve net zero by 2050. In partnership with Newcastle University and with funding support from North East LEP, we have built a whole energy systems village that closely replicates the UK's existing housing stock, comprising nine properties ranging from 1900's terraces to 1970's flats, and everything in between.

The buildings have been constructed using materials from the era of design and in line with building regulations in force at the time, and every home is packed full of state-of-the-art sensors. These will monitor everything from temperature and airflow to humidity and heat loss levels, so different companies can install and evaluate the performance of their technologies. This is a game-changing approach and will provide companies with a research facility where they can test their solutions in as close to real world conditions as possible, but without any disruption to customers.

In addition to testing, it will also act as a demonstrator site, where people can come to learn about different products available and be trained on how to retrofit a wide variety of house types. Landlords and social housing providers will use the site too, to find out how various solutions perform before making investment decisions on their own housing stock.

One of the first things happening at the CEV is an Energy Efficiency Project funded by NIA, which is being delivered in partnership with National Energy Action (NEA), Newcastle University and the Energy Innovation Centre (EIC). It will see us using the on-site properties to understand the impact of low-cost energy efficiency measures, including heating controls, boiler additives, ventilation and insulation materials. We'll be filming installations and interviewing installers to get their views on the ease of installation and costs. A sample of local residents will also be invited on-site to experience the different measures and give their opinions on them so that we can measure attitudes and perceptions.

Data extracted from this programme will then be used to inform further technical development of the products installed.



*"The CEV, and projects running within it, will allow technical providers to effectively test and refine sustainable technologies and materials before developing them and installing them into people's homes. Achieving net zero by 2050 is going to be a huge challenge, but this site will help the industry to create solutions that can transform properties into net zero homes that are comfortable to live in and enhance the wellbeing of occupants." -David Lynch, NGN Strategy Manager in Energy Systems*

*"Newcastle University is delighted to support the CEV, and is working in conjunction with NGN and other partners, including the Hydrogen Integration for Accelerated Energy Transition (HI-ACT) Hub, to actively shape research programmes that will take place there. This research and innovative collaboration between organisations will generate valuable evidence, which will help to shape the future of domestic decarbonisation across the UK." -Sarah Walker, Professor in Energy at Newcastle University*

### Key benefits

- A national first that will be fundamental in the development of zero carbon technologies that can be used to transform existing properties
- The site will be a real-life testbed for SMEs and businesses who are developing net zero solutions for domestic retrofits
- Masses of rich data will be collected from tests to inform future product development
- Data collected will also be used by us to engage with academia, the public and private sectors, and the Government, about the most effective net zero technologies for existing homes.

# Customer Vulnerability Mapping Tool

KEY THEME: CONSUMER VULNERABILITY

Project reference: NIA\_NGN\_300

Project partner: Egnida Innovation

Overall project value: £104,666



## Project summary

Made possible through NIA fund, we began creating the Customer Vulnerability Mapping Tool in 2021.

The base of this new tool is to use data for doing good, so we can offer more inclusive products and services across our communities.

Think of it as a multi-layered interactive map of the UK, which can be used by appropriate organisations who want to identify where vulnerable customers are located, understand which factors affect a community's resilience, and identify gaps in provision.

The tool pulls in a huge number of data points from sources such as the Office of National Statistics, local GP surgeries, live power and gas outages, and local schools, and scores geographic areas to measure the impact of

different filters – from energy, environment, health and finances to local services and incidents. This allows us to quickly see which areas need help on a particular issue and action a targeted response; for example, it might show us that we need to run an awareness campaign on services for fuel poverty in a certain area or prepare our response for a storm or a flood in another.

This was a relatively small investment for an enormous social return, made possible by funding from the NIA. Without it, we wouldn't have been able to join multiple data sets for the first time to affect positive change amongst our most vulnerable customers.

The tool is now in phase two of its development, with more and more stakeholders tapping into its resource.

***"This idea was born out of a necessity for understanding the scale of vulnerability in society. We needed to interpret complex data sets from excel spreadsheets in a more impactful visual format, so we worked with partners Egnida Innovation to create this never-seen-before software, which has enabled us to get a much better scale of customer vulnerability at a local, regional and national level, and respond accordingly."** -Steve Dacre, NGN Innovation Vulnerability Lead*

## Key benefits

- A single point of contact for vulnerability data, that is easy to view, understand and extract
- A live electricity outage map for the UK, which allows us to better understand the health of the region and population we serve
- Identifies emerging trends which we can then use to direct community partners on support needed in particular areas
- No more manual labour analysing spreadsheet data
- More inclusive services for all
- Quicker support on the ground for vulnerable customers.

# Wider Impacts of Hydrogen

KEY THEME: NET ZERO AND THE ENERGY SYSTEMS TRANSITION

**Project reference:** NIA\_NGN\_302

**Project partner:** National Engineering Laboratory, in collaboration with Cadent, SGN & WWU

**Overall project value:** £236,224

## Project summary

This year-long research project was undertaken in collaboration with other gas networks in the UK to help us bridge gaps in the current knowledge base around the impact of hydrogen conversion.

The velocity, density and viscosity of hydrogen through the gas distribution network will be different to natural gas, so along with everyone else in the industry, we had various questions that we needed answers to.

We engaged the expertise of The National Engineering Laboratory in Scotland to research, review and assess characteristic changes of hydrogen versus methane, and how that will affect the transportation of hydrogen through the existing gas network. But rather than physically testing these issues (which would be time and resource intensive), this tech-savvy project focused on using Computational Fluid Dynamics (CFD) modelling technology instead.

For example, dust in the pipework is a relatively small issue in the national gas network at the moment, but we needed to understand if switching to hydrogen might mean it would become a larger problem. CFD results suggested minimal variation in particulate pickup within distribution mains.

We also needed to test how Monoethylene Glycol (MEG) particles would act when used with hydrogen compared to methane. CFD showed that the particles saturated very slightly slower with hydrogen, but not to any level of concern.

The most complex model to measure was the level of noise through pressure regulation. This required a full network pressure regulator to be laser scanned and rebuilt as a 3D model for the fluid dynamics to be assessed. The conclusion was that the volume of the pressure regulator between hydrogen and standard gas is comparable, but the tone will be different.

We were then able to test pipe safety devices to see if they still operated in the same way with hydrogen and found that they act slightly faster. When we delved further into pressures across our filters, CFD highlighted a potential velocity issue with hydrogen in comparison to methane. Whilst the increase is within standards, it has demonstrated that we will need to work with our filter manufacturers to adapt to this increase to enable conversion to hydrogen.



***"Whilst we are in the early stages of our transition to hydrogen, this innovation project gave us the answers to fill gaps in that evidence case. The rigorous parameters of the CFD modelling were based on real network assets, eliminating the need for physical testing which would be hugely expensive. It's been a significant step forward in our hydrogen conversion journey."***  
**-Chris Bates, NGN Project Manager**

## Key benefits

- Using computational fluid dynamics allowed us to model the behaviour of natural gas extremely accurately
- Identified issues which need further investigation as we convert to hydrogen
- Helped build evidence that transporting hydrogen through the existing gas network is safe and viable
- Minimal physical testing required, saving time and money.



# LeakVISION & Thermal Imagery Analysis

## KEY THEME: DATA & DIGITALISATION

### Strategic Innovation Fund Round 1

Discovery Phase (Total Project Costs: £86,138.33) (SIF Funding Received: £78,182.50)

Alpha Phase (Total Project Costs: £525,075) (SIF Funding Received: £469,356)

### Project summary

LeakVISION is a miniature robot that uses thermal imaging to locate leaks inside the gas pipe network, which will transform how we detect gas leaks, making the process quicker, cheaper and less disruptive to the public.

Up until now, the standard method for detecting leaks has been to make holes in the ground along the length of a pipeline where a leak is suspected, before taking gas readings to locate the exact leakage location. It's a process that's time consuming, expensive and invasive.

In contrast, LeakVISION is small enough to be inserted directly into a pipe and travel along it to detect exactly where a leak is, before mapping it and updating records digitally. The data obtained in this process is transformative and will allow us to understand pipe conditions inside and out rather than having to rely on the human eye, which we've done for decades. The robot was developed with our partners, Synthotech, using NIA funding, and the first

phase of the project involved us creating a prototype robot and testing it in our network. We then secured Ofgem's Strategic Innovation Fund (SIF) to take the project to the Alpha Phase, testing the prototype robot in other networks, including pipes in London and the oldest gas main pipe in Ipswich. We also tested it inside a controlled hydrogen testing network, to understand any challenges and futureproof the technology, which was a world first.

This all happened in just six months and without any disruption to customers. It proved we can effectively deploy these miniature robots to find out exactly where leaks are, all without having to turn customers' gas off.

The Alpha phase also saw Synthotech further miniaturise the robot so that it fits inside smaller pipes. It previously only worked in pipes 12 inches and above, but it's now small enough to fit inside pipes that are just four inches wide.



***"The Alpha phase of SIF has seen us carry out a huge amount of work in a very short timeframe. LeakVISION is now small enough to detect leaks in the vast majority of the UK's gas pipe network and also works in hydrogen pipes. It will be instrumental in how energy networks are managed in the future."***

***"We are now waiting to hear about the next stage of this project, the Beta phase of SIF, which will involve a pilot roll-out of LeakVISION across NGN and Cadent's networks over a 4.5-year period. This phase of the project will see us further refining the technology and establishing the product in the market, helping to make networks safer and reducing greenhouse gas emissions from the methane gas network."***

***"At the end of the pilot, we expect LeakVISION to become the standard technology that gas distribution networks use to detect leaks, demonstrating how NIA funding kickstarts projects that can transform how energy companies operate."***

***-Simon Langdale, Synovate***

# Additional NIA Projects

## H21- Failure Modes and Permeation Testing of PE

Project reference: NIA\_NGN\_301

Project theme: **Net zero and the energy systems transition**

Overall project value: £435,226

Project partner: SGN, Cadent, WWU, Radius Systems

[Read more >](#)

## Biomethane Study

Project reference: NIA\_NGN\_337

Project theme: **Net zero and the energy systems transition**

Overall project value: £68,611

Project partner: WWU, CNG Services, EIC

[Read more >](#)

## H21 Occupied Trials Phase 1 Safety Case

Project reference: NIA\_NGN\_348

Project theme: **Net zero and the energy systems transition**

Overall project value: £45,600

Project partner: Pipeline Integrity Engineers

[Read more >](#)

## Hydrogen Village Consumer Research

Project reference: NIA\_CAD0074

Project theme: **Net zero and the energy systems transition**

Overall project value: £419,000

Project partner: NGN, SGN, WWU, BritainThinks, Savanta

[Read more >](#)

## Consumer Vulnerability Impact Assessment Tool

Project reference: NIA\_WWU\_2\_06

Project theme: **Customer Vulnerability**

Overall project value: £35,467

Project partner: All GDNs, All DNOs

[Read more >](#)

## Common Future End States and Transition Pathways

Project reference: NIA\_CAD0073

Project theme: **Net zero and the energy systems transition**

Overall project value: £195,000

Project partner: NGN, WWU, SGN, National Grid, Element Energy

[Read more >](#)

## Community Resilience

Project reference: NIA\_NGN\_357

Project theme: **Customer Vulnerability**

Overall project value: £88,657

Project partner: NEA

[Read more >](#)

## Streetscore 2

Project reference: NIA\_NGN\_338

Project theme: **Customer Vulnerability**

Overall project value: £328,119

Project partner: Steer Energy, Cadent, WWU, SGN, SSEN, NPg

[Read more >](#)

## NIA Improving CO Awareness

Project reference: NIA\_NGN\_334

Project theme: **Customer Vulnerability**

Overall project value: £130,649

Project partner: SGN, Frazer Nash Consultancy, IGEM

[Read more >](#)

# Additional NIA Projects

## Section 6: Additional NIA Projects

### HVT Legislation and Regulatory Analysis

Project reference: NIA\_NGN\_414

Project theme: **Net zero and the energy systems transition**

Overall project value: £500,000

Project partner: WWU, Cadent, SGN, XoServe

[Read more >](#)

### Supporting Vulnerable Customers in Power Cuts

Project reference: NIA\_NGN\_415

Project theme: **Customer Vulnerability**

Overall project value: £48,500

Project partner: Northern Powergrid

[Read more >](#)

### H21 Ignition Consequence Research

Project reference: NIA\_NGN\_344

Project theme: **Net zero and the energy systems transition**

Overall project value: £356,030

Project partner: NGGT, SGN, WWU, Cadent, DNV

[Read more >](#)

### Interventions for Hydrogen by Asset Group

Project reference: NIA2\_SGN0025

Project theme: **Net zero and the energy systems transition**

Overall project value: £276,547

Project partner: NGN, Cadent, WWU, DNV

[Read more >](#)

### Asset Data Intelligence (Data Quality AI Tool)

Project reference: NIA\_NGN\_407

Project theme: **Optimised Assets and Practices**

Overall project value: £205,906

Project partner: EY AgilityWorks

[Read more >](#)

### Digital Exclusion

Project reference: NIA\_CAD0088

Project theme: **Customer Vulnerability**

Overall project value: £92,887

Project partner: Energy Systems Catapult, NGET

[Read more >](#)

### H21 ATEX Equipment and SR/25 IA

Project reference: NGNG\_NIA\_346

Project theme: **Net zero and the energy systems transition**

Overall project value: £380,000

Project partner: Cadent, SGN, WWU, NGGT

[Read more >](#)

### Hydrogen Skills & Competencies

Project reference: NIA\_NGGT0185

Project theme: **Whole Energy Systems**

Overall project value: £410,186

Project partner: Cadent, NGN, WWU, SGN

[Read more >](#)

### Project Helix

Project reference: NIA\_NGN\_359

Project theme: **Customer Vulnerability**

Overall project value: £100,100

Project partner: Cadent

[Read more >](#)

### Hydrogen Blending Func Spec Infra T1

Project reference: NIA\_CAD0076

Project theme: **Net zero and the energy systems transition**

Overall project value: £211,808

Project partner: NGN, SGN, WWU

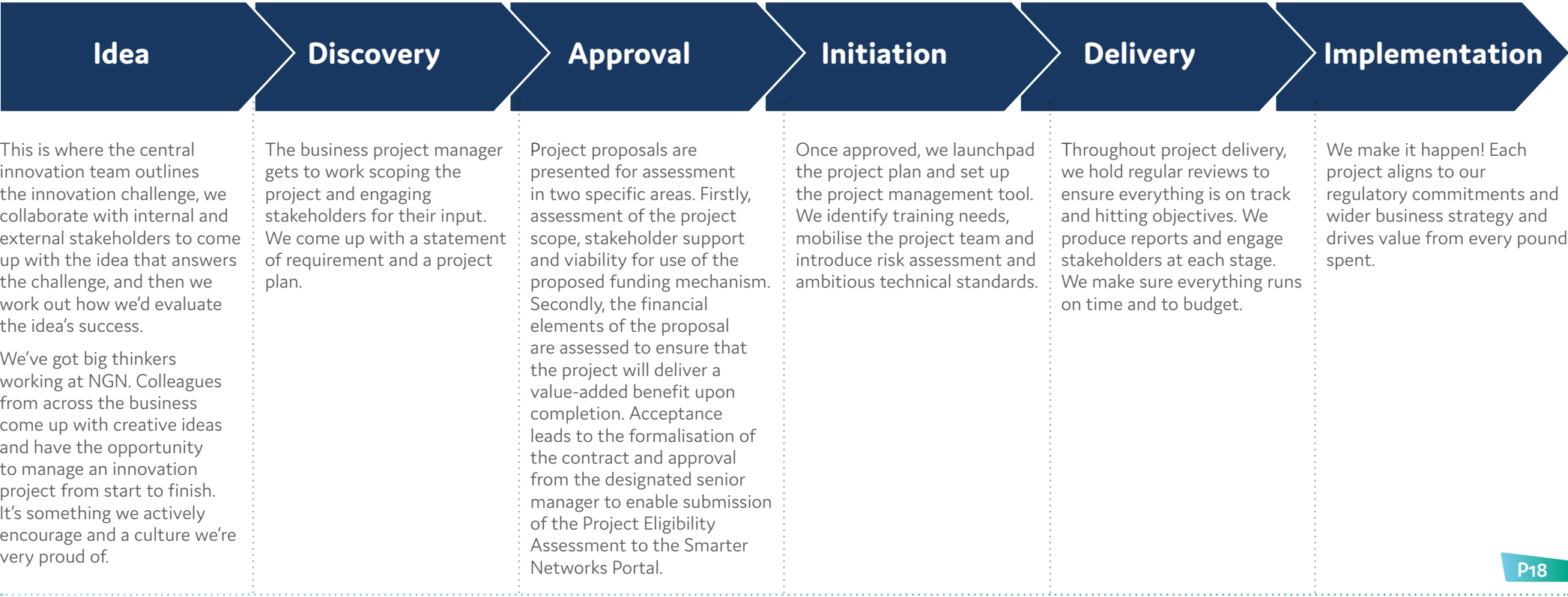
[Read more >](#)



# How we deliver successful innovation projects

Our six-step system for successful innovation projects spans the lifecycle of a project and guides how we develop and deliver innovation within NGN. We’ve worked meticulously on it, refining it over the past few years to ensure the best outcomes on our innovation projects.

It’s a robust system that ensures we are driven by data and stakeholder input at every stage, and that if a project isn’t delivering against objectives, we can intervene more quickly.



# Working together to deliver a greener, fairer future

The big challenges that the UK faces, such as climate change, requires the energy sector to work together, sharing information and delivering complementary projects.

## A shared strategy for whole systems innovation

Last year saw the introduction of the utility sector's first combined gas and electricity strategy for whole systems. Leading to the creation of even more opportunities for collaboration around innovation.

Whole systems thinking refers to the need to look at all forms of energy production and network activity to ensure a joined-up approach to get the UK to net zero. It is vital that utility companies don't just think within their own silos.

NGN and the other UK energy networks teamed up with the Energy Networks Association (ENA) to develop a strategy with clear goals which aims to deliver a broad range of benefits to customers and support the transition to net zero.

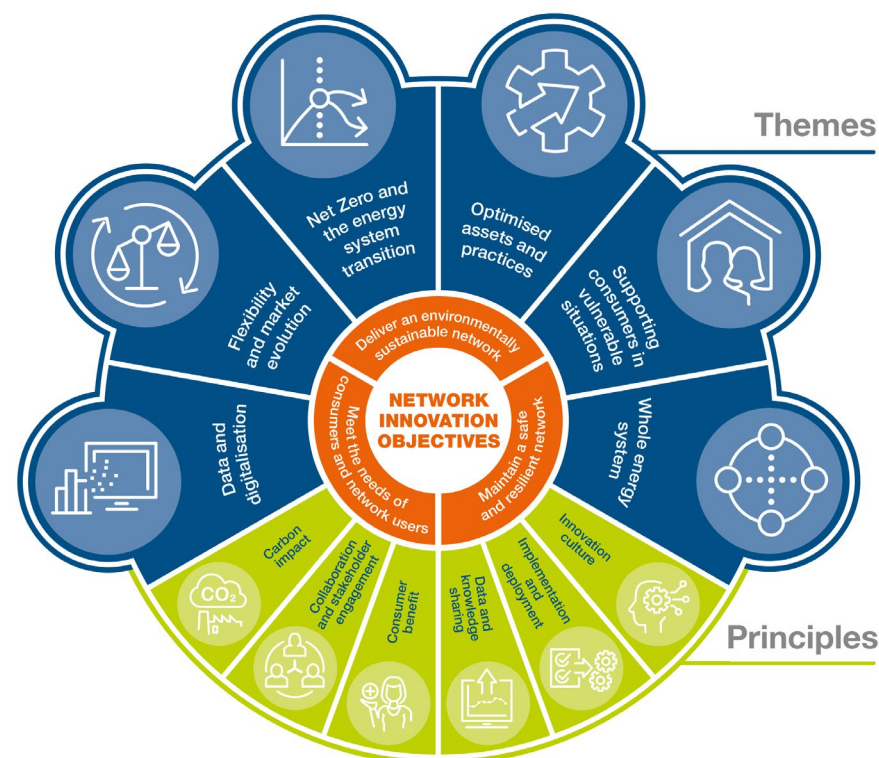
By tackling the key issues facing our energy system, it sets out our ambitions for network innovation in a crucial period post COP26 and ensures that our innovation projects share the

same strategic direction and deliver benefits to the communities we serve.

Measuring the true impact and value of an innovation project is complex and often involves more than simply recording cost savings. Energy Networks have developed a process to capture these metrics, known as the IMF (Innovation Measurement Framework). The outcomes from the IMF are published annually by NGN - providing stakeholders with an accurate and comparable representation of the benefits of investing in network innovation.

## Industry working partnerships

Energy Innovation Centre: Over the past six years, we have developed a strong collaboration with the Energy Innovation Centre (EIC), a not-for-profit organisation which brings industry and innovation together. The organisation acts as a conduit to over 7,000 SMEs.



# What's next for innovation at NGN?

Innovation will continue to play an integral role in our day-to-day operations, and over the next 12 months we'll be further developing existing projects and preparing for future energy systems, with a heavy focus on hydrogen, digitalisation and customer vulnerability.

In year one of RII0-2, our innovation focus was on engaging with partners and kickstarting new projects, year two has involved collecting evidence and information from these projects, and next year we'll continue gathering data and use our findings to inform future decisions about the best routes for the UK to reach net zero.

Some of our key innovation focus areas over the next 12 months will include:

## Customer Energy Village (CEV)

Our Customer Energy Village in Thornley, Gateshead, will go live this year, and we'll be engaging with stakeholders to create a research and testing schedule for companies to come and test their technologies in a real-life environment. This will enable us to identify the best solutions available for retrofitting different types of UK homes and determine what whole energy systems should look like in the future.

## Hydrogen conversion

To support Net Zero, we're exploring the conversion of our gas network to transport 100% hydrogen through an extensive research programme. In addition to exploring the safety and operational implications of a conversion, we're developing our plan to create the UK's first hydrogen village in Redcar and proposing hydrogen town pilots in Teesside, Leeds and Hull. Through our East Coast Hydrogen Programme, we are exploring with our partners how we can repurpose and build a hydrogen network to connect hydrogen production with industrial and commercial users.

## Vulnerable customers

We'll continue to work hard to identify vulnerable customers, pinpoint their exact needs and create innovative solutions to help them and reduce fuel poverty.

## Digitalisation

We'll continue to digitalise our network above and below the ground, to enable us to gather the data we need to build a detailed picture of our systems so that we can make more informed decisions and effectively plan for the future.

Over the next year, we'll also be exploring wearable technologies so we can monitor the conditions our people operate in and develop solutions to make them safer and healthier. We have a successful track-record of seeing innovation projects through from implementation to completion, resulting in the creation of large-scale initiatives and groundbreaking products that will transform how the industry operates.

Many of these projects started life thanks to NIA funding, and we are always looking to partner with other business and SMEs looking to create innovative solutions and products that will help shape the future of the energy market. Please get in touch if you would like to talk to us about an idea.







**we are  
the network**

## Get in touch

**If you're an innovator with great ideas and you want to work with NGN, we'd love to hear from you.**

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To work with us on future strategic innovation funding opportunities: [SIF@northerngas.co.uk](mailto:SIF@northerngas.co.uk)

To work with us on innovation projects or opportunities: [innovation@northerngas.co.uk](mailto:innovation@northerngas.co.uk)

**a** Northern Gas Networks, 1100 Century Way,  
Thorpe Park, Leeds, LS15 8TU

**t** @NGNgas

**f** @northerngasnetworks

**w** [northerngasnetworks.co.uk](http://northerngasnetworks.co.uk)